

The Iron Age

A Chilton Publication

THE NATIONAL METALWORKING WEEKLY

JULY 14, 1955

How will
price boost
affect
steel products?
See page 59

Dream Dishwasher
-1962?



NEW DEPARTURES OF TOMORROW



Today, most every type of appliance found in the home—automatic dishwasher, automatic washer, dryer or other time- and work-saving device—uses New Departure ball bearings to assure better operation for the life of the machine.

What a wife-saver! At the push of a button this "dream" machine goes to work on dishes . . . scrapes, washes, dries, sterilizes and stacks them back on the shelf, ready for use.

Where is it? Well, it's probably nestling in the back of some designer's mind right now. But once it reaches a concrete stage, you can bet accurate, easy-rolling New Departure ball bearings will be called for to keep all moving parts functioning smoothly and automatically. For New Departure can be self-sealed, lubricated-for-life, so that they require no maintenance.

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NEW DEPARTURE

DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

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you can trust!*

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FOR ACCURACY!

Chromel-Alumel thermocouple alloys are unconditionally guaranteed to register true temperature—e.m.f. values within close specified limits . . . $\pm 4^{\circ}\text{F}$. from 0° to 530°F.; $\pm \frac{1}{4}\%$ at operating temperatures from 531° to 2300°F.

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Chromel-Alumel thermocouple alloys are produced exclusively by

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Tool Steel Topics



On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

They Wing Screw Drivers at Fast Clip with Dies of BTR



It's efficiency-plus at the busy plant of Oxwall Tool Co., Ltd., Oxford, N. J. For here there's every kind of machine for the high-speed manufacture of all kinds of quality screw drivers. They turn them out by the millions, large and small, including an ingenious worm-like screw driver which can be bent around corners at the touch of a finger.

The plant has a battery of 10-ton presses where the wire blank is winged on the end opposite the blade (see illustration above) so that it can be anchored in the plastic handle. The typical forming dies used in this operation are made of BTR (Bethlehem Tool Room) tool steel. Oxwall engineers tell us that these BTR dies, hardened to Rockwell C48-50, are giving long service life in this application.

BTR is our general-purpose, manganese-chromium-tungsten grade of oil-hardening tool steel, perhaps best known for its safe hardening property. It also has good abrasion-resistance and toughness, and is ideal for practically every application where long wear is desirable.

If you would like to give BTR a workout in your shop just put in a phone call to your Bethlehem tool steel distributor. You'll find him well stocked with BTR, and anxious to be of service to you.



Assortment of screw drivers made by Oxwall Tool Co., Ltd. Each blank is winged by a die of BTR tool steel, for firm anchorage in handle. Model shown in illustration at the upper right, with flexible shaft which can be bent as needed, is an ideal time-saver for cramped quarters.



SHOCK-RESISTANCE PAYS OFF AS DIE MADE OF 67 CHISEL PUNCHES HOLES IN HIGHWAY GUARD RAIL

Because of its excellent shock-resisting properties, this die of Bethlehem 67 Chisel tool steel provides economical punching of bolt holes in beam-type highway guard rail. The die, hardened to Rockwell C-51, operates in a 200-ton press. In addition to its shock-resistance, 67 Chisel is wear-resistant, making it ideal for such applications as shear blades, hot-work tools, blanking tools and swaging dies.



BETHLEHEM TOOL STEEL ENGINEER SAYS:

Here's How to Harden Tools with Holes

Ordinarily holes in tools cannot be eliminated. Nor can their size or location be changed, in most instances. So steps must be taken to control the ill effects of holes, such as tools cracking during the hardening operation. Although it is impossible to outline a procedure for all tools, the following principles are recommended for those containing holes:

1. Quench tools so that the internal surfaces of the tools harden completely. When holes are relatively large, no special attention may be necessary; for small holes, flush-quenching may be required.
2. If it is possible that effective quenching may not occur completely throughout the holes, pack them so that hardening cannot take place in the holes, assuming that this condition is allowed on the tool. Use clay, asbestos, steel wool or steel inserts.
3. If only the surface of a hole is to be hard, as on a ring die, flush-quench the bore while protecting the outside surface from the quench.

The internal surface of a hole should be either uniformly hard, or uniformly soft. The worst possible condition is an irregular hardness pattern on the inside surface, because the high stress developed may result in cracking.

Starred items are digested at the right

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NEWS DEVELOPMENTS
HOW MUCH WILL STEEL WAGE HIKE COST YOU? — P. 59

Steel company price increases have raised the IRON AGE Finished Steel Composite by \$7.62 per ton. Unlike '54, the full cost of the steel wage hike was passed on to consumers. Some grades of stainless boosted \$40-\$50 per ton. Total cost of wage boost to steel companies is estimated at \$450 million.

CARRIER SHORTAGE HURTS ORE IMPORTS — P. 64

Newly developed Labrador and South American iron mines increase need for seagoing ore carriers. Steel and shipping firms place orders with foreign shipyards for more bottoms. Fairless Works alone will take 5 million tons of Venezuelan ore this year. St. Lawrence Seaway will bring Labrador ore to Great Lakes mills.

AIR FORCE PUSHES TITANIUM PROGRAM — P. 65

Air Force appropriation for titanium research is stepped up. Red display of air might leads to new interest in wonder metal. Aircraft industry will be encouraged to make greater use of it, work more extensively on fabricating and handling. New jet alloys are needed.

CTC: MAKES ONE TRACK DO WORK OF TWO — P. 66

Centralized traffic control, a highly efficient electric and electronic train control and signaling system, makes it possible for one track to carry almost as much traffic as two tracks. But trend to CTC isn't cutting railroads' demand for steel rails since rate of replacement is stepped up.

LIGHT MATERIALS HELP CUT AUTO WEIGHT — P. 76

Today's cars average about 30 lb of aluminum. Total may reach 100 lb in another 15 years. Plastics also cut weight on some auto parts. Chrysler is biggest user of light metals, averaging about 70 lb per car. All first half auto production records were broken and record year is assured. GM splits stock, offers stock buying plan to salaried help.

ALUMINUM CUTS AIRCRAFT TOOLING COSTS — P. 85

Lockheed uses aluminum as die backing instead of zinc-base alloy. It cuts die metal costs to one seventh. It's good for short runs and size is not an important consideration. Lockheed machines large structures from slabs of aluminum. Now scrap goes into foundry and comes back as aluminum ingots for casting dies.

ENGINEERING & PRODUCTION

METAL GATHERING HAS MANY ADVANTAGES—P. 99
High strength metal parts with integral end sections are produced by "gathering." This unusual process accumulates plastic metal under pressure at the ends or in the middle section of tubing or bar stock. The technique induces increased strength, good grain flow and uniform metallurgical properties.

PRESSURE WELDING GIVES STRONG JOINTS — P. 103
Pressure welding provides a reliable fabricating method for 3 pct Al-5 pct Cr titanium alloy. It produces a forged butt weld of superior strength by upsetting the faying surfaces under heat and pressure. Hot working during welding improves weld strength without changing the basic character of the alloy's grain structure.

METAL FINISHING: NEW DEVELOPMENTS — P. 106
Speeded-up production programs have placed a burden on metal finishers but new machines, processes, materials and instruments are helping them to keep pace. Compact and versatile plating machines can also be used for anodizing or immersion coating. New instruments aid platers in turning out specification plate.

COATINGS: DESIGN FOR ANTI-CORROSION — P. 108
Angles, corners, welds, rivets and edges are major trouble spots when it comes to coating steel structures. Regardless of coating material quality, good structural design is a must for effective protection.

OXYGEN GIVES LIFT TO OLDER OPENHEARTHS—P. 112
Steel quality and steel operations have been improved at Inland's Indiana Harbor Works by the use of oxygen in its No. 2 openhearth shop. More important, the competitive position of the older openhearth has been greatly improved. Oxygen consumption last year was nearly 1.2 billion cu ft. Its use gives better fuel input, greater flexibility with scrap, faster meltdown and few long soaking periods among other advantages.

MARKETS & PRICES

MALAYAN TIN, RUBBER TO GET SUPPORT — P. 62
World Bank is preparing to lend several million dollars to prop up shaky tin and rubber industries in the Malay Peninsula. Need is for rehabilitation, not expansion. See tin market dropping off as trend to electrolytic tinning spreads.

NEW MARKETS FOR SILICON OPENING UP — P. 68
Latest use for the nonmetallic element is in power rectifiers. Other commercial outlets are found in pigments application, in steel and aluminum alloys, in briquette form in foundries. Lower refining costs, plentiful supply promise such new developments as: lower-cost TV sets, desk-size electronic "brains."

TOOL BUILDERS GET READY FOR BIG SHOW — P. 87
Chicago Tool Show will bring out latest in automatic machine tools. Emphasis will be strictly on automation for show, but standard tools will also be ready for buyers. Theatrics are ruled out for exhibitors who must rely on tools to attract showgoers to their booths.

USERS WILL PAY PENALTY FOR STEEL STRIKE — P. 115
The short strike may cost steel producers more than a week's production. Losses due to shutting down and starting up the mills will hit consumers when they can least afford it. Tinplate, cold rolled sheet, and enameling sheet will be hit hardest. The shutdown also affected pig iron production and some mills will halt sales during July. The sizzling scrap market will be affected by hot metal losses.

CARRYOVERS ARE STILL THE BIG HEADACHE — P. 156
Results of the recent 12-hour steel strike are still being felt by producers and consumers. Third quarter carryovers have been extended one to two weeks on major mill items which means that deliveries are now running behind on an average of seven to 8 weeks. Producers, in the face of current back order log jams, are cautiously eyeing fourth quarter orders.

NEXT WEEK:

STRIP CUT UP LINE SOLVES HANDLING PROBLEMS
Hot-rolled steel strip can be cleaned, oiled and cut to size more efficiently and in less time in an unusual strip cut up line. It provides better material realization and greatly reduces direct labor. Shot blast cleaning replaces all pickling. Handling operations are pared to a minimum by novel methods.

WHAT'S THE FUTURE FOR U. S. BUSINESS COSTS?
Steel price increases will hit steel consumers. How much of the rise will be passed on to more remote industries? Will increased costs pyramid? Next week's story goes into this question, discussing effects of the steel hike on users of machine tool and production equipment telling who will be hit and how much.

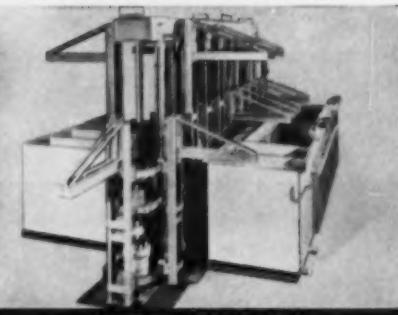


"LITTLE STEVE"
Rock Type Machine

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Unit's load capacity, mechanical flexibility and lift design meet tomorrow's increased safety and production requirements.



"STEVADOER"
Rock Type Machine

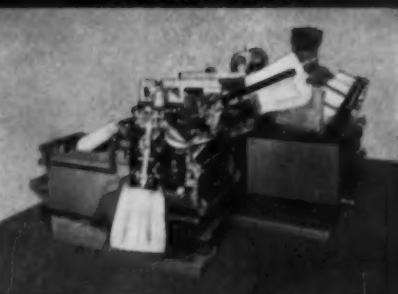


MODEL "A"
Rock Type Machine

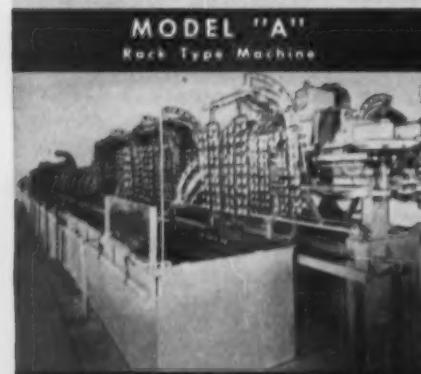
A compact automatic processing machine, embodying the famous Stevens auxiliary cam shaft and lifters for rapid vertical transfer.



A proven automatic barrel machine for plating and processing small parts. Only unit with fully automatic load and unload features.



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MODEL "B"
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Features rapid, continuous movement processing employing hump type cams. Design permits utmost mechanical and cycle flexibility.



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operations. Stevens can furnish a job-engineered, cost-cutting, fully automatic machine that will answer every production need whether it be for electroplating, cleaning, anodizing, bright dipping. You will get better control, better finishes and eliminate rejects with Stevens Automatics.

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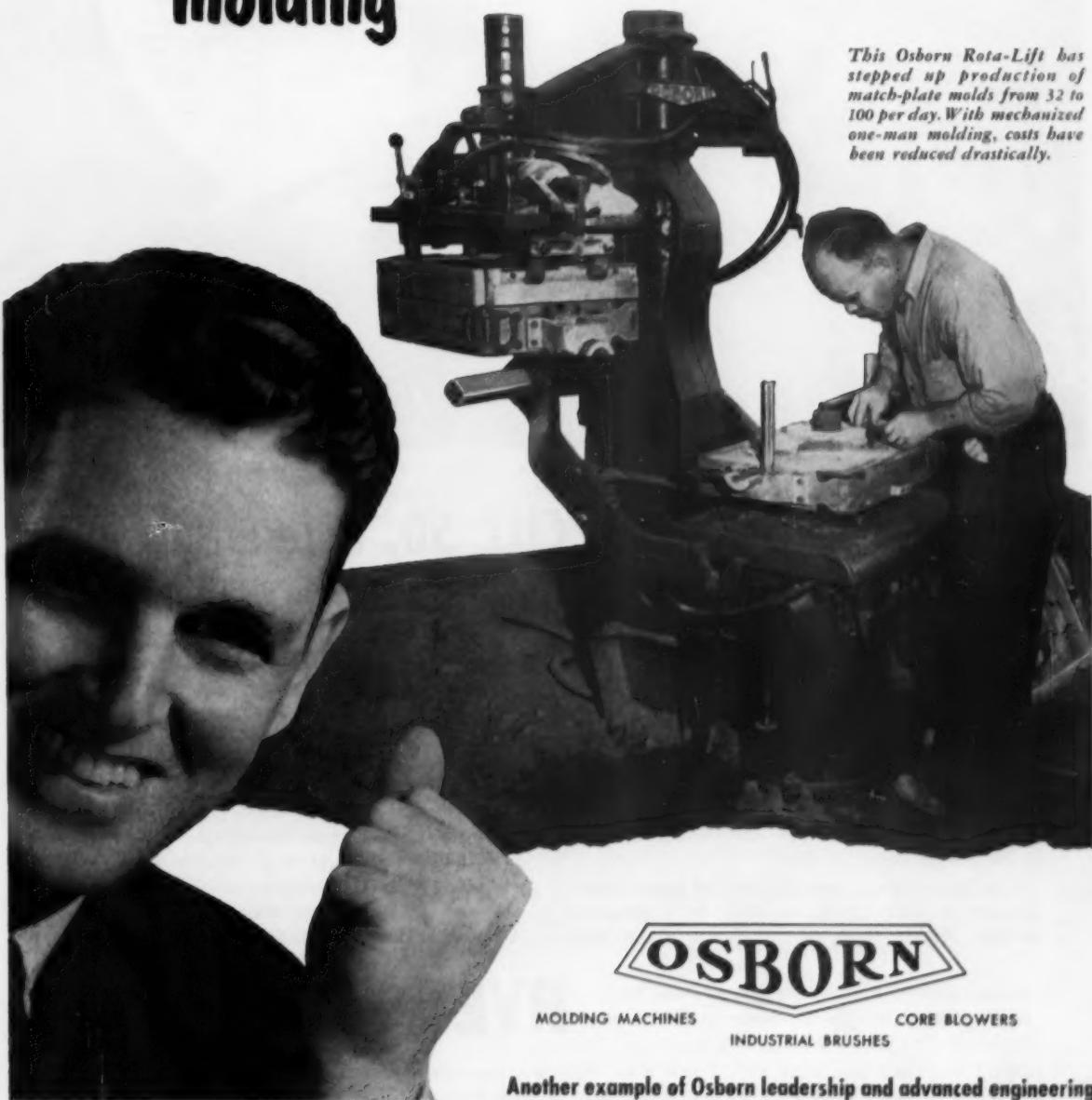
any foundry can handle large match-plate molding

Now Osborn Rota-Lift, not the mold maker, supplies the "muscle" to handle large match-plate molds. It helps roll over molds, draws the cope and closes the mold . . . in addition to jolting and squeezing.

Complete molds are made by one man on one machine, doubling, often tripling production.

Osborn can help *you* cut foundry costs with Rota-Lift by duplicating these results in your plant. Call or write *The Osborn Manufacturing Company, Dept. FF-33, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

This Osborn Rota-Lift has stepped up production of match-plate molds from 32 to 100 per day. With mechanized one-man molding, costs have been reduced drastically.



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CORE BLOWERS

INDUSTRIAL BRUSHES

Another example of Osborn leadership and advanced engineering



**LOWERS COST
OF FINISHED PARTS
... HERE'S WHY**

Increases production as much as 200%.

Cuts 25% to 75% faster than comparable standard analyses.

Lengthens tool life from 100% to 300%.

Retains strength—lead has no known effect on mechanical properties.

Machines to excellent finish, exceptionally bright and smooth.

Announcing NEW RYCUT 50, a leaded alloy *fastest machining alloy steel in its carbon range*

Here's a medium carbon alloy steel which for the first time combines the high mechanical properties needed in heavy duty applications with the free-cutting characteristics of a carbon manganese steel.

Shop after shop has saved up to 75% in machining time, lengthened tool life by as much as 300% and increased production up to 200% after switching from a standard medium-carbon alloy to New Rycut 50.

The secret lies in the addition of a very small amount of lead (.15% to .35%) by a patented process. Finely dispersed, the lead acts as a lubri-

cant between steel and cutting tool—giving greatly increased machinability without known effect on mechanical properties—the hardenability of New Rycut 50 compares with that of AISI 4150.

You can get quick shipment of New Rycut 50—annealed or heat treated in rounds of many sizes—from your nearby Ryerson plant. For worthwhile savings, try this remarkable alloy in your shop for production or maintenance applications.

Also on hand at Ryerson—two other leaded alloys: Low carbon Rycut 20 and medium carbon Rycut 40. Also Ledloy, the fastest cutting carbon steel.

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and the Engineering Index.**



Editorial:

Are We Being Sucked In?

• WHEN THE RUSSIANS talk peace they tend to fool everyone except other Communists. They use the same language which they have always used. There is no difference today than in the past, except that some of their people in top places are showing a sham courtesy.

Characteristics such as going through museums, posing for pictures and using a soft voice instead of a rasping arrogance are supposed to make free men out of Communists. The sad part of it is that many of our top diplomats act as if they are falling for this guff.

When we talk peace we mean peace. We mean that we seek a world where right will prevail and where democratic processes will be available for the masses. What's more, we pour our money, our time and effort into trying to get everyone in the world to believe we mean what we say. Today we are bending over backward in our wild search for peace talks. Maybe we are going overboard.

Our leaders have said that our people should not be too optimistic about the talks at the "summit." But who is responsible for the widespread false hopes in our country and in some European countries? It is not the people themselves. It is the very people who are telling the country not to get their hopes too high.

We may have to pay a steep price some day for our peace talk. Some day we may be sorry that our Secretary of State was reduced to the position where he almost assisted the Russians in their apology for shooting down one of our planes. It is hard to understand why we would help the Russians make their excuses to us for shooting down a plane which constitutes part of our defense setup in the far north.

We do not have to be crude or harsh or short-tempered in our dealings with the Communists. But we don't have to go to the other extreme and think that because some highly placed Russians begin to act like human beings they are entitled to our full trust and respect.

We are forgetting recent history and what has been done to us and to the free nations by the Communists. For some reason or other when our leaders talk about how the Russians have changed for the better, we as a people begin to believe what we want to believe.

Are we going to be sucked in again by those who have only one aim—to destroy the free world? We can be courteous but let us not be infantile in our dealings with the world's gangsters.

Tom Campbell
EDITOR

To Change the Style
Change the STEEL
Switch
To **Sharonart**



The name SHARONART identifies Rolled-in design patterns produced by Sharon Steel Corporation and Divisions.

SHARONART offers texture patterns to the appearance designer. Usually it has been necessary for the manufacturer to combine another material with steel to obtain such finishes.

This textured material can be fabricated by any usual steel processing methods.

Complete flexibility of design is available with SHARONART. Any repetitive design you prepare can be reproduced on steel.

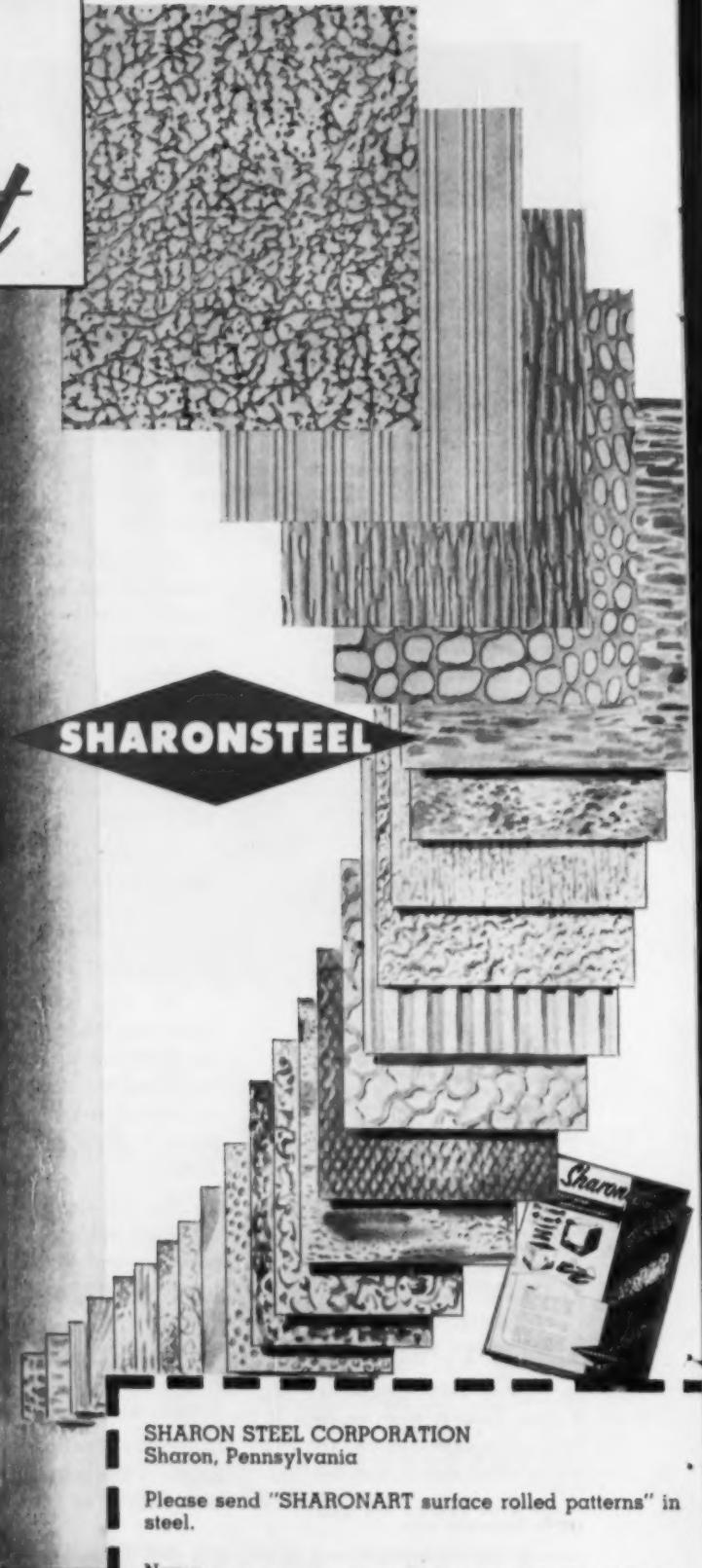
Investment in one pattern is relatively small. Changes in your product's appearance are simple to arrange.

Technical advice and assistance are available to customers wishing to adopt this new material.

A brochure giving complete information of our sizes, pattern designs and numbers, product uses, pictures of designs and products made from SHARONART steels and methods of fabrication is available (see coupon).

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Sharon, Pennsylvania

Please send "SHARONART surface rolled patterns" in steel.

Name _____

Position _____

Company _____

City _____ Zone _____ State _____

dear editor:

letters from readers

Joseph Hall, Circa 1830

Sir:

In 1830 one Joseph Hall invented the pig boiling process for producing wrought iron. We've been trying to locate a picture or a woodcut of Hall. We've tried the Carnegie Library, The American Iron and Steel Institute and the Bettmann Archive without success. Can you help? *M. J. Feldman, Philip Klein Advertising, 16th & Locust, Philadelphia 2, Pa.*

We've checked carefully at the New York Public Library, also without any luck. Perhaps a reader can help.—Ed.

"100 Years"

Sir:

Congratulations on a magnificent job of work in your special issue. It is truly a beautiful issue from both editorial and production standpoints.

Without detracting in any way from your accomplishment, I was struck by the conspicuous omission of a subject that is directly related to iron, vitally significant, and of increasing importance—the fact that it corrodes. I hope that you will look more deeply into the burgeoning technology of corrosion control and give the subject more editorial consideration in the future. Even so—well done! *L. R. Smith, Advertising Manager, Amercoat Corp., South Gate, Calif.*

Sir:

Your 100th Anniversary Issue certainly provides a nostalgic field day for some of us men who can remember in our early days of trade paper work hearing about the giants of the past. The names of Williams, Findlay, and others were those that we conjured with 30 years ago. I am taking the book home for more leisurely reading

and to see where scrap fits into the picture. I note that on p. 3 you refer to the soft swearing of a purchasing agent on reading that No. 1 heavy melting steel has advanced \$1, but I find no reference to a hollow laugh when the market dropped \$1.

Very obviously, a tremendous amount of research went into the book and it certainly will be a bible for those in the future doing research. Congratulations from the Institute. *E. C. Barringer, Executive Vice-President, Institute of Scrap Iron & Steel, Inc., Washington, D. C.*

Personal Recorder

Sir:

In the June 16 issue, p. 41, we read an item entitled "Put Five Hours of Talk in Your Pocket."

We are interested in a recorder of this type and would like to know if you can give us the name of the manufacturer. *C. K. Shuey, Keystone Mfg. Co., Schuylkill Haven, Pa.*

Details on the personal recorder, called Minifon P-55, may be obtained from Geiss-America, 6424 N. Western Ave., Chicago 45, Ill.—Ed.

New Lubricant

Sir:

In the June 2 issue of THE IRON AGE in the Materials Roundup section, p. 117, reference is made to a lubricant (Useco-Lube) which is impregnated into the pins of a conveyor chain and effectively reduces friction by 75 pct.

I would appreciate any further information you can give me on this. *J. H. Fuchsluger, Metallurgist, Koppers Co., Inc., Baltimore, Md.*

Further information may be obtained from U. S. Engineering Co., 14561 Lesure Ave., Detroit 27, Mich.—Ed.



WATER SAVING with TROUBLE-FREE COOLING EQUIPMENT

● Cools your jacket water for engines or process equipment or electric apparatus. Your closed system keeps free from dirt or maintenance troubles. You can cool air, gases, chemicals, plating baths, quench baths, welding machines, extrusion and drawing machines and hydraulic presses. You get real precise temperatures, save rejections, lower production costs. Use NIAGARA AERO HEAT EXCHANGER cooling with atmospheric air... saves water, pumping, piping and power; quickly saves its costs.

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No. 120
and 124

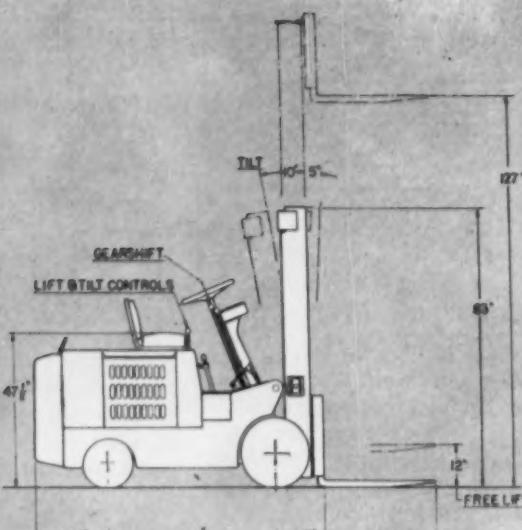
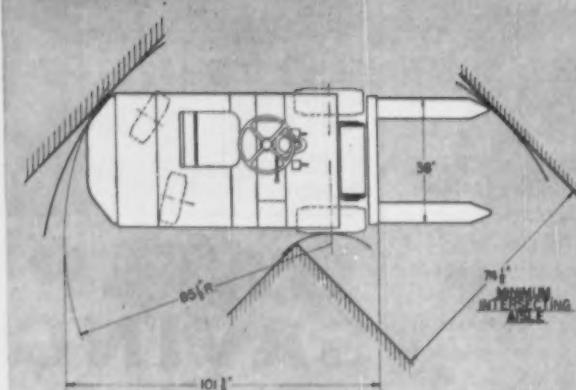
● Convenient
Units Up To
30,000,000
BTU Capacity



NIAGARA BLOWER COMPANY
405 Lexington Ave., New York 17, N.Y.

District Engineers
in Principal Cities of U. S. and Canada

BAKER "FG" GAS FORK TRUCK...



Dimensional Drawing of FG-60, 6000 pound capacity.

why "BALANCED DESIGN" makes it the best!

"Balanced Design" means that every component be engineered to its specific function. Further that all elements be matched and coordinated to work together for top efficiency, maximum dependable service and longest life.

In the "Balanced Design" Baker FG Gas Trucks, for example, you get an integrated power train, consisting of drive axle, transmission and clutch, selected and engineered to be the best possible unit to perform its required function. Features include: compact rigid construction without troublesome universal joints, split clutch housing for easy accessibility, and *single oil supply for entire assembly*.

"Balanced Design" also assures you that the power plant is not merely an automotive engine modified for truck use. It is a heavy-duty industrial engine specially engineered for rugged industrial truck service and built by an outstanding manufacturer. Our specifications call for moving parts to balance much closer than ordinary engine parts: pistons balanced to \pm grams instead of ounces, crankshaft to 4 inch-ounces and connecting rods to 2 grams.

These are some of the reasons why Baker "FG" is the only gas fork truck with a full 6 months' warranty, and why we say "BALANCED DESIGN" makes it the best.

Baker "FG" gas fork trucks are available with 3,000, 4,000, 5,000 and 6,000 pound capacities. Specific bulletins can be obtained by writing The Baker-Raulang Co., 1227 West 80th Street, Cleveland 2, Ohio.



8 REASONS WHY THE BAKER FG FORK TRUCK IS FIRST IN ITS CLASS...

1. LOWER INITIAL COST—FG-40 (4000 lb.) \$4295. Other models at proportionate savings.
2. LONGER WARRANTY PERIOD—Baker quality permits full 6 months warranty.
3. HIGHER LIFT—Mast design allows higher standard lift than ordinary trucks.
4. LOWER MAINTENANCE COSTS—Designed for easier and less frequent servicing.
5. MORE MANEUVERABLE—Short turning radius cuts aisle width, adds floor space.
6. EASIER TO OPERATE—Greater visibility . . . easy-to-work controls.
7. GREATER STABILITY—Lower center of gravity, higher "stability factor" ratio.
8. BETTER BRAKING—Full floating, self-equalizing, self-energizing brakes.

Baker
HANDLING EQUIPMENT

fatigue cracks

by William M. Coffey

Fermez la fenêtre—Voltaire



Among our long-standing friends is Brooks Elder, one of the best photographers in NYC dealing in executive and industrial work. If you turn to page M-33 of your "100 Years of Metalworking" you will see an outstanding example of his executive work. (We refer, of course, to the only real executive on the page, the dynamic looking chap with the glasses in the middle of the bottom row.)

Brooks and his wife run the Multiples Studio and in the course of doing much photographing for "100 Years" they became so taken with our 100th birthday that they set up in their window the display which you see pictured here. (For some reason we can't think of, they left out the aforementioned executive which by all odds was the best example they had.) As their studio is just opposite Track 102 in the lower level of Grand Central Station we figure that 1,876,939 people learned that IRON AGE is 100 years old.

Women

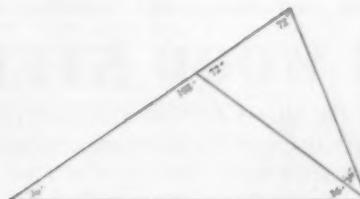
In our never-ending quest to find out about women we ran across this handy little item which can take its place with our other story about the Canadian sergeant who put his wife through pack-drill every day.

London—Robert E. Want, 54, told a divorce court judge his wife had: Packed his lunch

with sandwiches made of mud; filled his lunchbox with broken glass instead of tea; slammed the car door on his fingers; hit him with a poker; thrown a can of creosote on his suit; emptied two buckets of ashes and a pail of wet garbage on him. The Judge granted the divorce.

Puzzlers

Here's how to construct two isosceles triangles with one common side, so that two of them form another isosceles triangle.



Winners: I. M. Darcey; Dale Letterman and the Charlsie Club; and Mildred Chapman.

now you can
produce
trouble-free,

FREE-
MACHINING
STEEL
with
**FOOTE
MANGANESE
SULPHIDE**

This fume-free ladle additive increases quality and reduces the cost of producing high sulphur, free-machining steels . . . with these plus advantages:

1. **improved hot rolling behavior**
2. **fewer surface defects**
3. **fewer diversions**
4. **lower conditioning costs**
5. **low carbon content saves heat time**

TYPICAL ANALYSIS	
Manganese	53%
Sulphur	32%
Carbon	.22%
Sizes 1" x 5" lump	

write for further details!

Foote
MINERAL COMPANY

438 Eighteen W. Chelten Bldg.
Philadelphia 44, Pa.



BUILDS EXTRA SELLING POWER INTO YOUR PRODUCTS



Custom production and precise metallurgical control---

make the difference in
STRIP STEEL

—and . . . we might add . . . a difference in your product sales.

ALAN WOOD STEEL's long-established practice of "custom-producing" precisely to your specifications under the highest standards known . . . assures you of strip steel that contributes a dependable, durable quality to your products . . . and

which helps build reputation and repeat sales.

If you require strip or sheet steel —hot or cold rolled—choose an integrated steel specialist with modern, up-to-date, continuous mills . . . one who understands your production problems and delivers according to your specifications.

ALAN WOOD STEEL COMPANY

steelmasters for 129 years • CONSHOHOCKEN, PENNA.

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia • New York • Houston
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Richmond • St. Paul • San Francisco • Seattle • Montreal and Toronto—
A. C. Leslie & Co., Limited

SM-12

dates to remember

JULY

DROP FORGING ASSN.—Annual meeting, July 19-22, Grove Park Inn, Asheville, N. C. Assn. headquarter are at 605 Hanna Bldg., Cleveland.

TRUCK TRAILER MANUFACTURERS ASSN., INC.—Summer meeting, July 21-22, Detroit. Association headquarters are at Room 710 Albee Bldg., Washington.

AMERICAN TRADE ASSN. EXECUTIVES — Annual meeting, July 31-August 3, Grand Hotel, Mackinac Island, Mich.

EXPOSITIONS

MACHINE TOOL SHOW—Presented by National Machine Tool Builders' Assn., International Amphitheatre, Chicago, September 6-17, inclusive. This is the first industry-wide showing since 1947 of the advances in machine tools.

AUGUST

AMERICAN SOCIETY OF TRAINING DIRECTORS — 2nd Annual Institute August 7-20, Eagle Waters Resort, Eagle River, Wisconsin.

DENVER RESEARCH INSTITUTE—4th annual symposium on Industrial Applications of X-Ray Analyses, August 11-12, University of Denver, Denver, Colo.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS — Pacific General Meeting, August 15-19, Butte, Montana.

NATIONAL INDUSTRIAL CONFERENCE BOARD AND STANFORD RESEARCH INSTITUTE—National symposium on current "Electronics and Automation Production," August 22-23, San Francisco, California.

WESTERN ELECTRONIC SHOW AND CONVENTION — August 24-26, Civic Auditorium, San Francisco, California.

NATIONAL ASSOCIATION OF FURNITURE MANUFACTURERS — August 28-September 1, Conrad Hilton Hotel, Chicago. Showing on new products and ideas.

GENERAL MOTORS — Powerama, August 31-September 25, South Lake Shore Drive, adjacent to Soldier Field, Chicago.

SEPTEMBER

INTERNATIONAL BRIQUETTING ASSN.—Annual conference, Sept. 1-3, Stanley Hotel, Estes Park, Colo. Association headquarters are at University of Wyoming, Laramie.

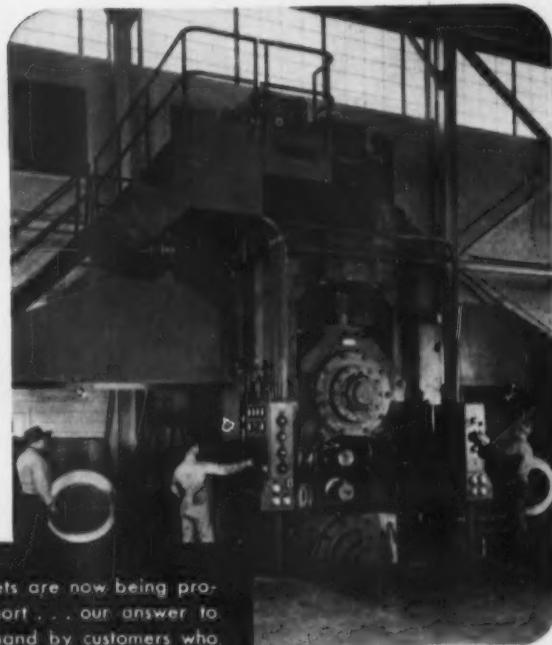
AMERICAN MACHINE TOOL DISTRIBUTORS ASSN.—Annual meeting, Sept. 5-6, The Blackstone, Chicago. Association headquarters are at 1900 Arch St., Philadelphia.

INSTRUMENT SOCIETY OF AMERICA —Annual meeting, Sept. 12-16, Shrine Auditorium, Los Angeles. Society headquarters are at 1319 Allegheny Ave., Pittsburgh.

PACKAGING MACHINERY MANUFACTURERS INSTITUTE—Annual meeting, Sept. 15-18, The Homestead, Hot Springs, Va. Institute headquarters are at 342 Madison Ave., New York.

NOW... COLD-ROLLED SHEETS FROM

Newport Steel



Cold-rolled sheets are now being produced at Newport . . . our answer to a long-time demand by customers who find our hot-rolled products meet their most exacting requirements in quality, economy and service. These sheets are being rolled on a reversing cold mill just installed as part of our continuing program of expansion and modernization. Seventy years old in experience, new in facilities and methods, Newport is strategically located in the heart of the nation's greatest industrial growth—a dependable source for all the products listed here. You will profit by discussing your requirements with Newport before you buy more steel.

PRODUCTS OF NEWPORT STEEL

Cold-Rolled Sheets
Hot-Rolled Steel in Coil
Hot-Rolled Pickled Steel in Coil
Hot-Rolled Sheets
Hot-Rolled Pickled Sheets
Galvanized Sheets
Galvannealed Sheets
Colorbond Sheets
Electrical Sheets
Alloy Sheets and Plates
Electric Weld Line Pipe
Roofing and Siding
Eave Trough and Conductor Pipe
Culverts

ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads and 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.

Newport Steel

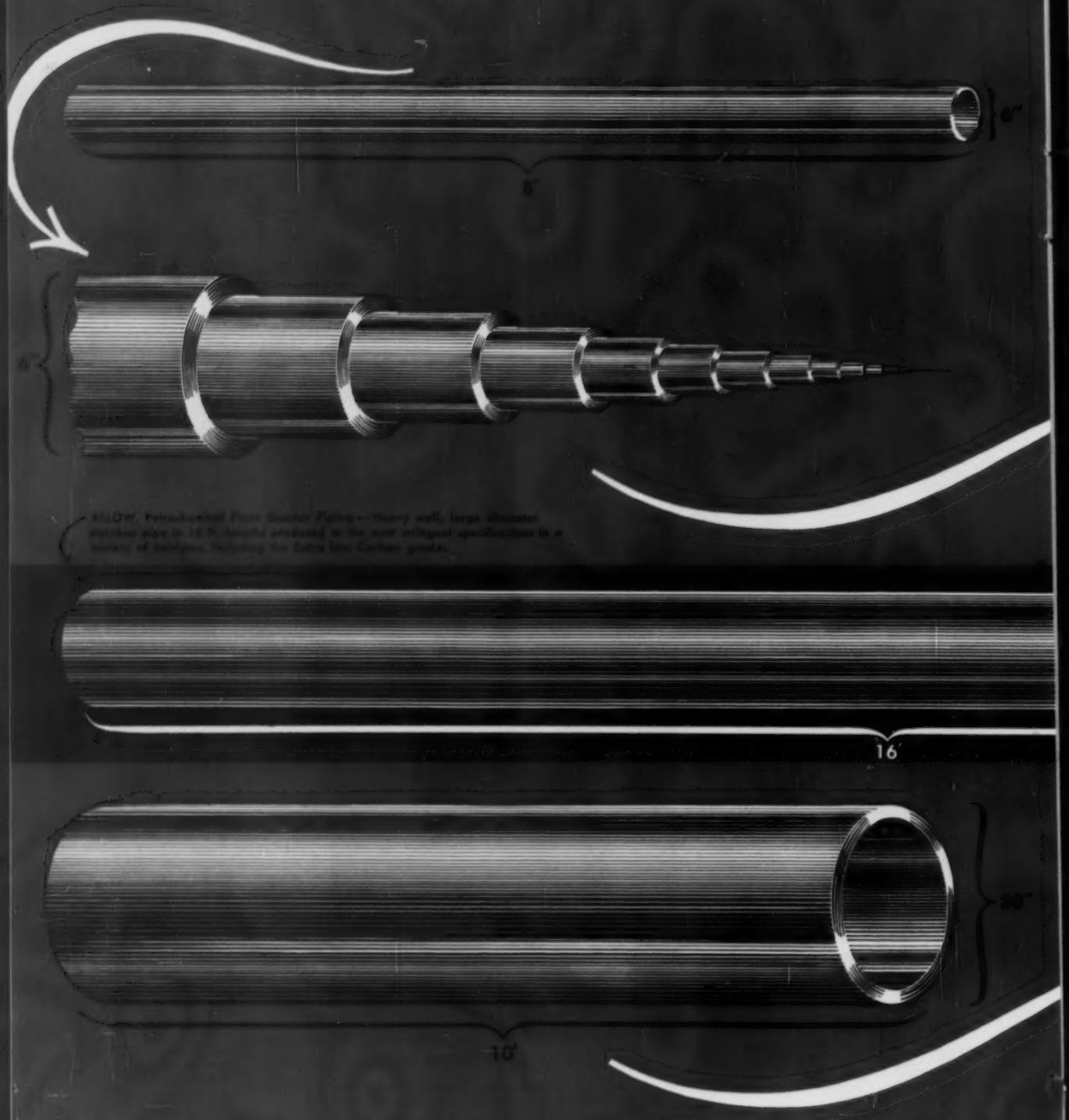
CORPORATION

NEWPORT, KENTUCKY



YOUR CONFIDENCE IS JUSTIFIED WHERE THIS FLAG FLIES

A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION



16" Pre-Assembled Pipe Section Flowing—Heavy wall, large diameter welded pipe in U.S. Grade produced to the most stringent specifications in a variety of materials, including the Extra Low Carbon grades.

UNITED STATES PIPE & FOUNDRY CO.
Special Products Division

BURLINGTON, NEW JERSEY

SALES OFFICES: LOS ANGELES, SAN FRANCISCO, CHICAGO, ST. LOUIS, CLEVELAND, DETROIT, PITTSBURGH, HARTFORD, BURLINGTON



3 PROBLEMS each different

1 SOLUTION . . .

stainless steel Centrifugal Castings

Heavy Wall stainless steel pipe, centrifuge bowls, hollow billets for finely drawn hypodermic needle tubing . . .

These are among the many end uses for metal mold centrifugally cast cylindrical shapes. They are typical of the exacting, difficult service conditions to which this product is subjected. All three examples shown demonstrate the fundamental versatility of this manufacturing process—unequaled product soundness—from hypodermic needle stock subjected to the repeated stresses of cold reduction, to the centrifuge bowl spun



Hollow Billets for cold reducing into small diameter stainless tubing, even down to hypodermic needles—ultimate proof of metal soundness. Many metallized non-piercible grades of pipe and tubing can be hot or cold reduced from centrifugally cast billets.



Centrifuge Bowl Shell produced from multiple length sections and machined to shape desired.

**SIZE RANGE
AND COMPOSITION
FLEXIBILITY**



Outside Diameter—4" to 36"

Wall Thickness— $\frac{1}{8}$ " and up

Length—Up to 16' in the "as-cast" condition

Types of Stainless Cast—All Standard AISI and ACI grades of ferritic and austenitic stainless, including No. 20 Alloy, 17-4 PH, 17-7 PH and E.L.C. grades.



*The man who needs a new
machine tool and doesn't buy it
is paying for it anyway...*

**in obsolete
techniques**

How can you tell when a machine or a process is obsolete?

Suppose you buy another machine of the same model that has been doing a satisfactory job. Do you know whether a different, more recently developed machine tool would do your work more accurately, faster, cheaper?

There is one sure way to keep up on developments and improvements—talk frequently to machine tool builders. Discuss your problems with their field engineers. It is their business to help you—to give you the benefit of their specialized experience.

Take Microhoning*, for example. Each year sees tremendous strides in applying this low-velocity abrading process to the problems of industry, through new machines and new techniques developed as new problems arise. Micromatic maintains the world's largest staff of honing specialists and has been responsible for every major development in honing in the past 25 years.

So if you're not in close touch with our representatives as well as with other tool engineers, you may be paying now, in obsolete techniques, for the new machine tools you don't have.



PART:

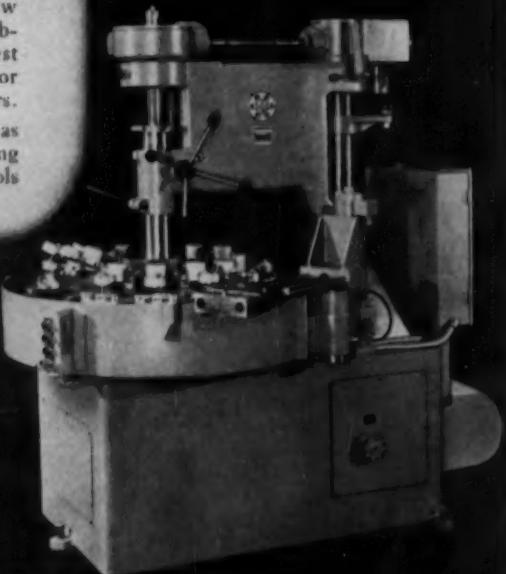
Valve body (automatic transmission)
of die cast aluminum.

PROBLEM:

To produce flat surfaces that will hold a seal when assembled without gaskets. High production required.

SOLUTION:

Microhoning removes .001"-.002" stock to generate flatness within .0002" and a flat finish that hold required pressure. Production 1200 parts per hour.



***MICROHONING = STOCK REMOVAL + GEOMETRY + SIZE CONTROL + SURFACE FINISH**

MICROMATIC HONE CORPORATION
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4119 South Second East, Salt Lake City, Utah • Perina Machinery & Supply Co., 1921 First Ave. South, Seattle 4, Washington
REPRESENTATIVES IN ALL PRINCIPAL COUNTRIES

MICRO-PRECISION DIVISION • 3205 Lee Street, Evanston, Illinois
Hydraulic controls • Diesel fuel injection equipment

Visit Booth 1311 at the Show.
See demonstrated how Microhoning
represents obsolete techniques.



PUZZLED?

*...about the problems
of machine
tool replacement?*



IF SO...

GREATER
SAVINGS



JONES & LAMSON

offers you

THIS COMBINATION

FINEST
MACHINES

Modern machine tools that produce greater work accuracy at lower costs than ever before.

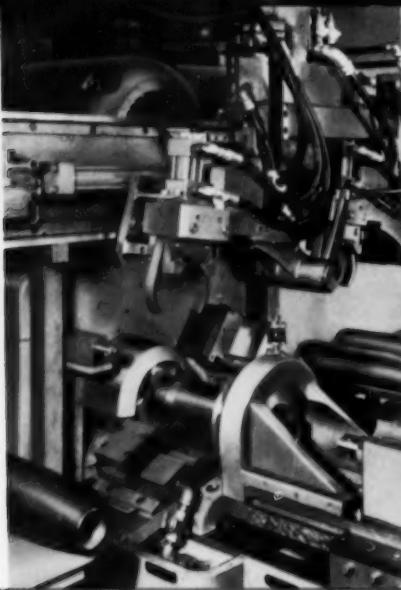
Scientific research in machining methods, metallurgy, tool geometry and inspection procedures.

Realistic Procurement — you have your choice of several sound financing methods, plus the advantages of new tax laws with more equitable write-offs.

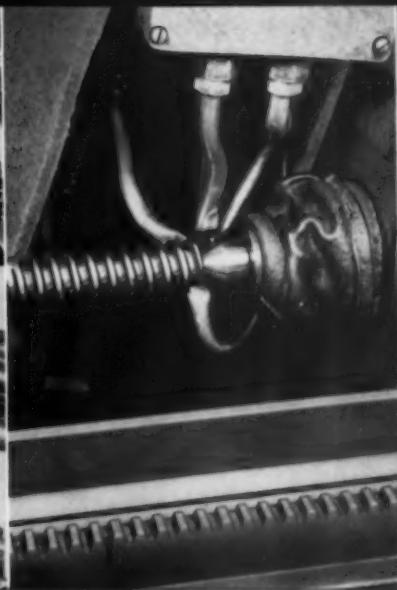
From initial survey of your production requirements right through to delivery and installation of new equipment, every phase of J&L's Replacement Program service is complete, competent and reliable.

EASIEST
PROCUREMENT

The man who needs a machine tool . . . is already paying for it.



AUTOMATIC HANDLING



NEW METHODS

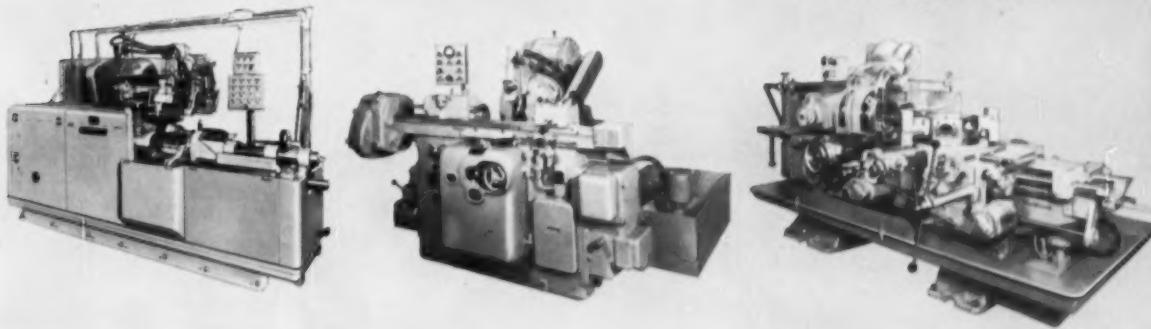


VERSATILE TOOLING

Completely automatic operation of this Fay Automatic lathe, including *loading, machining, chip and coolant disposal and unloading*, ups production to 180 pcs. per hour at 100% efficiency in the machining of these shells.

By grinding this worm (stock removal .1235" — one pass) on a J&L 6 x 36" Automatic Thread Grinder, production is increased 160% per machine over previous methods.

High production methods of tooling for automatic lathes were simplified and applied to three 7B J&L Universal Turret Lathes. Inner and outer Ball Bearing Races are produced on the same machines. Set up time from one lot to the next does not exceed fifteen to twenty minutes per machine.



Jones & Lamson's unique Procurement Plan offers you a choice of methods for procuring new, high-efficiency equipment. You may buy outright; pay-from-productivity on a variety of bases, at interest rates of 3 1/4% and lower (add-on); or you may use any of several variations of a truly flexible lease plan.

JONES & LAMSON MACHINE CO.,
511 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

Universal Turret Lathes • Fay Automatic Lathes • Automatic Thread & Form Grinders
Optical Comparators • Automatic Opening Threading Dies & Chasers
Automatic Double-End Milling & Centering Machines

Valuable information is yours for the asking.
Simply fill in the coupon below, *clip it to your letterhead*, and mail.



HOW TO

"GUARANTEE" A "GUARANTEE"



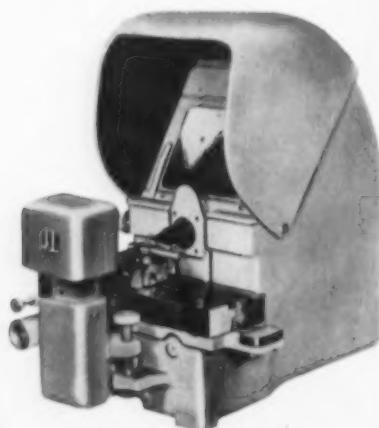
Every set of Jones & Lamson Die Head chasers carries this full guarantee: *to produce Class III threads, or better, across the board*. To insure this guarantee, and to keep manufacturing costs down, J&L carries on successive interoperation inspections the positive way, with Jones & Lamson Optical Comparators.

(We practice what we preach)

**Avoid costly work on scrap—
Prove machining results before subsequent operations**

Controlled quality means lower costs. Use J&L Comparators on *your* production line . . . their versatility is unlimited.

Write Dept. 710 for
information on
Comparators and/or
Jones & Lamson
Thread Tool Products.



JONES & LAMSON

JONES & LAMSON MACHINE CO., 511 Clinton St., Dept. 710, Springfield, Vt., U.S.A.



Dovetails of chasers are straddle milled. Tolerances checked on
The J&L OPTICAL COMPARATOR



Mill angle on front end of chaser.
Length and angle checked on
The J&L OPTICAL COMPARATOR



Dovetail angle milled. Angle and
centerline checked on
The J&L OPTICAL COMPARATOR



Ratchets for spacing are milled.
Chaser length, ratchet form and
spacing checked on
The J&L OPTICAL COMPARATOR



Back chamfer is milled. Angle and
flat checked on
The J&L OPTICAL COMPARATOR



After heat treating, dovetail is
ground. Angles, flats and depth in-
spected on
The J&L OPTICAL COMPARATOR



Grind thread form. Thread form,
angles, root, crests, spacing, lead and
helix checked on
The J&L OPTICAL COMPARATOR



Chamfer ground as specified. Angle
and amount below root checked on
The J&L OPTICAL COMPARATOR



Top rake ground. End grind and
point height checked on
The J&L OPTICAL COMPARATOR



*World's largest manufacturer
of Optical Comparators since 1919*

OPTICAL COMPARATOR DIV.

If it's really
"just as good..."
it's got to be
Gargoyle D.T.E.



When you're offered substitutes for Gargoyle D.T.E. oils, remember these facts...

We're always pleased to hear someone say *his* oil is "just as good as Gargoyle D.T.E." It's an admission of an industry-accepted fact... Gargoyle D.T.E. hydraulic oils are the *standard of performance* in this field!

The quality of Gargoyle D.T.E. hydraulic oils is so uniformly high—their performance so dependable—that in hundreds of machines they have given thousands of hours of trouble-free service! This is why they also improve machine production—help reduce manufacturing costs.

Yet, with all these benefits, Gargoyle D.T.E. hydraulic oils cost less than *one-half cent* per machine per hour in hundreds of systems. And when you include the lubrication engineering service that goes with them—the world's greatest—you can see why these famous oils actually save you money in the long run.

So don't accept anything less than Gargoyle D.T.E. oil. It's the *only* oil that's *really* "just as good" as they say!

SOCONY MOBIL OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION
Formerly Socony-Vacuum Oil Company, Inc.

announcing...



*for economical protection
against product contamination
and discoloration*

***made by the Bart Process**



Now you can give your products protection against contamination and discoloration during processing, storage and transportation . . . and at a surprisingly low cost! It's possible through the use of CF&I LECTRO-CLAD Nickel Plated Steel, electroplated by the patented Bart Process.

For over ten years, the Atomic Energy Commission and leading chemical processing firms have used pipe and fittings nickel-electroplated by the Bart Manufacturing Corporation process. Now, by combining Bart's experience in this field with CF&I's wide range of research facilities, this process has been extended to produce CF&I LECTRO-CLAD plate and sheet as well as pipe and fittings.

These steel products have all the strength of regular carbon steel; in addition, they're coated with a

uniform, heavy layer of metallic nickel that's over 99% pure. This gives much better protection against product contamination and discoloration than bare carbon steel or steel protected with various coatings.

What's more, CF&I LECTRO-CLAD Nickel Plated Steel can be shaped and fabricated by all of the usual methods without damage to its nickel coating. Bend it . . . weld it . . . roll it . . . the protective nickel layer will not check, spall or flake!

Perhaps you can use CF&I LECTRO-CLAD Nickel Plated Steel to excellent advantage in your product handling, transportation and storage operations. For full details, contact the nearest district sales office listed below.

Claymont Steel Products

*Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation
Wilmington, Delaware*



2942

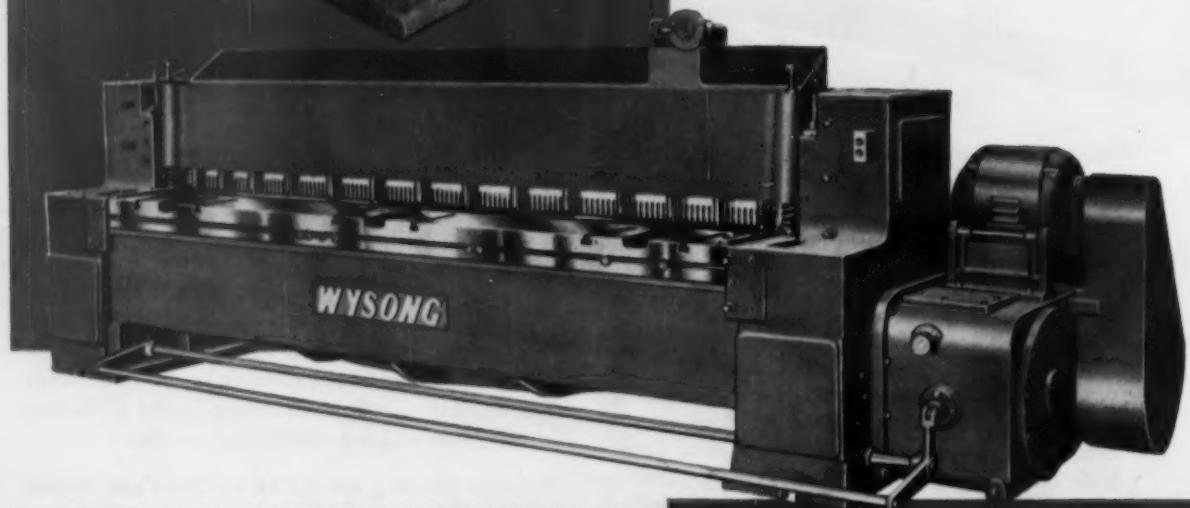
Abilene • Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles
New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita
CANADIAN REPRESENTATIVES AT: Edmonton • Toronto • Vancouver • Winnipeg

OTHER CLAYMONT PRODUCTS

Stainless-Clad Plates • Carbon and Alloy Steel Plates • Flanged and Dished Heads • Manhole Fittings and Covers • Large Diameter Welded Steel Pipe • Flame Cut Steel Plate Shapes

CHATEAUGAY TOUGH

Photo, courtesy of Wysong & Miles Company, Greensboro, N. C., manufacturer of power squaring shears, woodworking machinery, bending rolls.



REPUBLIC STEEL CORPORATION
3104 East 45th Street
Cleveland 27, Ohio



Please have a Republic Pig Iron Metallurgist call.
I am interested in more information on:
 Chain Slings Wedge-Lock Steel Shelving
 Collaps-a-tainer

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____



PIG IRON MAKES CASTING JOBS EASY...

The gear box and end frame housing, shown at left, for a power squaring shear are good examples. Because both hold oil to lubricate moving parts, freedom from porosity is a prime casting requirement—plus density, strength and wear-resistance.

To meet these strict requirements, the manufacturer uses Chateaugay, Republic's exclusive premium Pig Iron. The results are dense, strong castings with high wear-resistance and no porosity. Chateaugay fills molds completely and quickly—sets rapidly and shrinks evenly. Regardless of size or shape, Chateaugay produces uniform

soundness, close grain structure and uniform cross-section density throughout every casting.

Chateaugay castings are inherently tough, strong and resistant to wear. Yet they machine easily and economically whether planed, milled, drilled, tapped, reamed or ground.

A Republic Pig Iron Metallurgist will be happy to give you the complete story on Chateaugay, the low phosphorus, copper-free Pig Iron, and the way it can help you make tough casting jobs easy. There's no cost or obligation for his services. Just let us know when you would like him to call.

REPUBLIC STEEL

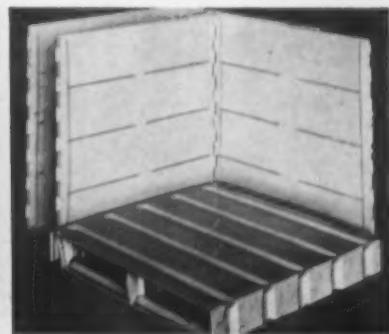
World's Widest Range of Standard Steels and Steel Products



EASY WAY TO HANDLE HEAVY CASTINGS—Republic Chain Slings provide an exceptionally high degree of safety in numerous foundry operations, like moving and handling heavy castings, flasks, etc. Made by Republic's Round Chain Division, they're available in alloy steel, High Test Super-steel, and wrought iron. All are proof tested and warranted to meet or exceed specifications.



EASY WAY TO STACK ENORMOUS WEIGHTS—Republic Wedge-Lock Steel Shelving is designed for high stacking of heavy items—with no sagging, swaying or buckling. Joints actually get tighter as weight increases. Made by Republic's Berger Division, Wedge-Lock Steel Shelving provides maximum loading in minimum floor space. Completely flexible, it assembles quickly and easily.

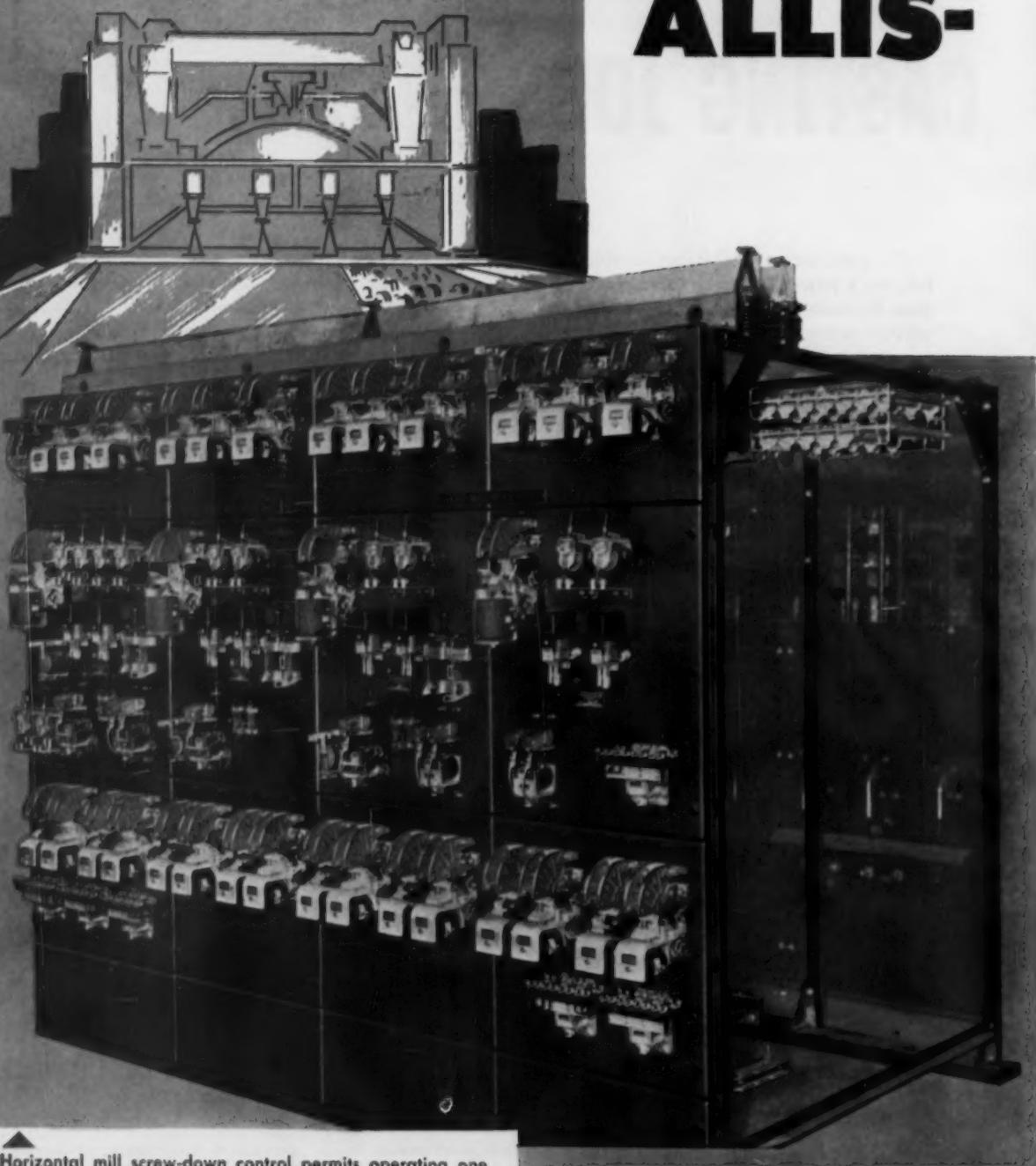


EASY WAY TO REDUCE INTERPLANT SHIPPING COSTS—The Collaps-a-tainer was developed by Republic's Pressed Steel Division to reduce interplant shipping costs. Four collapsed units ship in the space of one open unit. It's easy to assemble, lightweight, strong and durable, easy to knock down. It stacks to any practical height and can be used on the production line or as a storage bin.

**STEEL MILL
AUXILIARY CONTROL**

Engineered

ALLIS-



▲
Horizontal mill screw-down control permits operating one motor for two screws through clutches. Horizontal mill housing adjustment panel is a reversible dynamic braking controller. Vertical mill roll adjustment panels permit operating two motors in unison or individually.

ALLIS-

and Built by **CHALMERS**

INSTALLED in some of the nation's largest mills, these Allis-Chalmers mill auxiliary controls are providing smooth, precision performance . . . affording maximum production with a minimum of outage time and maintenance.

When you modernize or expand, take advantage of Allis-Chalmers experience and engineering skill in building steel mill control. For further information see your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wis.

A-4744

Motor control for hydraulic feed pumps. Non-reversible with field accelerating and field decelerating relays.

Two reversible controllers with dynamic braking and series brake for an upcut shear and shear pinch roll.

Reversible dynamic braking controller for roll conveyor. Operates at two speeds in either direction.



CHALMERS

THE NEW BOSTON GEAR

100 SERIES

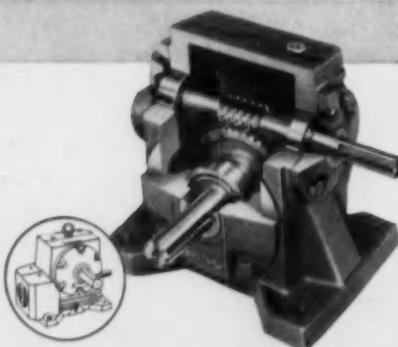
SPEED REDUCTION UNITS

Every feature you want-
any model you need -
FROM STOCK

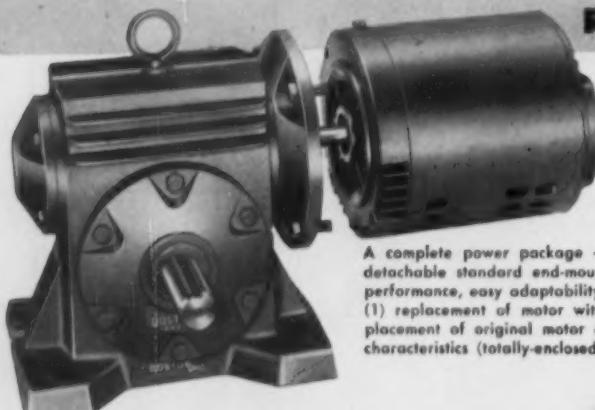
REDUCTORS



- CERTIFIED ratings
- NEW space-saving design
- NEW clean contours
- NEW gearing efficiency
- NEW cooling fins
- FAN-COOLING optional on larger sizes

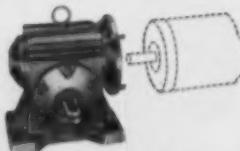


RATIOMOTORS



— all new features
of Reductors plus
NEW
*Combination
CONSTRUCTION*

A complete power package — gear reduction unit and easily detachable standard end-mounted motor — combined for peak performance, easy adaptability, big maintenance savings. Permits (1) replacement of motor without disturbing gear unit. (2) Replacement of original motor at any time with motor of special characteristics (totally-enclosed, etc.).



FLANGED REDUCTORS The Ratiomotor gear reduction unit, supplied without motor. You buy and attach the motor of your own choice.

Certified **MAXIMUM HORSEPOWER PER DOLLAR**

CALL YOUR

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NEW CATALOG

R-56

gives
complete details,
selection charts,
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PATENTS APPLIED FOR

108
MODELS
1064
STANDARD STOCK
UNITS

Look under "GEARS in the Yellow Classified Section of your Telephone Directory for the BOSTON Gear Distributor nearest you.

55 BG-R-13

24

CONTINUOUS GALVANIZING LINES BUILT BY AETNA

• The 25th Aetna-built Continuous Galvanizing Line could be yours. If you are considering a Continuous Galvanizing Line, you probably have ideas about the most practical process for your production. The lines offered by Aetna-Standard include all of the different processes and types in use today. This ability to combine specialized knowledge of Continuous Galvanizing with your own specific ideas is a principal reason for Aetna's building more lines than all other manufacturers. Add the most important requirement of all—performance of the equipment, plus integrity and ability to work with people, and you have some of the reasons why more companies select Aetna-Standard than any other manufacturer to build their Continuous Galvanizing Lines.

Will the 25th be yours?

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO • ELLWOOD CITY, PENNSYLVANIA

GOOD EQUIPMENT BRINGS DOWN
PRODUCTION COSTS



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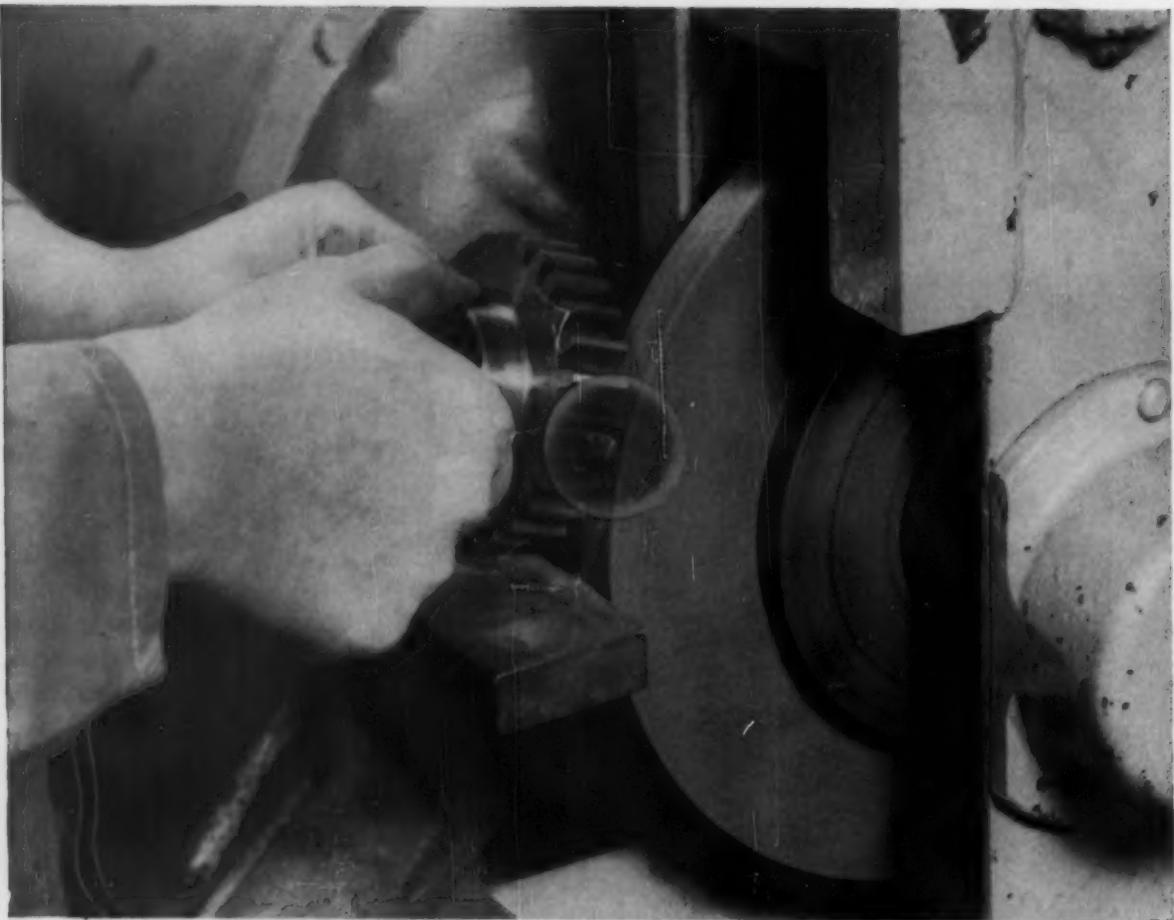
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Designers and Builders to the Ferrous,
Non-Ferrous, Leather, Rubber, and Plastic Industries



BF — A universal favorite for removing light welds, breaking edges on machined work, deburring, taking off flash from plastic parts and many other light portable and bench grinding operations. To be used on periphery only.

The jobs they do!...The money they save!

Norton Reinforced Wheels add the "TOUCH of GOLD" that cuts time and costs on countless everyday grinding jobs

You get *more* than 100 cents' worth of usefulness for every dollar you spend on Norton Reinforced Wheels.

You get extra-long service life, exceptional strength and fast, cool, trouble-free grinding — the Norton-engineered "Touch of Gold" that saves you money in the widest range of routine grinding jobs, from light deburring to heavy cutting-off.

To this top grinding performance Norton Reinforced Wheels add a wide margin of safety. All four are resinoid bonded and reinforced by

layers of tough fabric molded into them. As follows:

BF — *Semi-flexible straight wheel, cotton fabric reinforcement. Also available in mounted wheels and points and hand sticks.*

BN — *Straight wheel with glass cloth reinforcement. Primarily a cut-off wheel, its rough knurled sides provide additional cutting action.*

BD — *Rigid hub-type. Glass cloth and Nylon reinforcement. Designed especially for right angle portables and disc sanders.*

BFR — *Semi-flexible hub-type. Cotton fabric and Nylon reinforcement.*

See Your Norton Distributor

for a demonstration of Norton Reinforced Wheels in your shop, on the jobs you're doing every day. Ask him for the new, 34-page illustrated catalog on Reinforced Wheels. Or write to **NORTON COMPANY, Worcester 6, Mass.** Distributors in all principal cities, listed under "Grinding Wheels" in your phone book, yellow pages. *Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.*



BN — The preferred cut-off wheel for non-ferrous and non-metallic jobs. Also excellent for cutting wire rope, slotting rails, tuck pointing etc. Used on swing-frame and stationary cutting-off machines, large and small portables.



BD — A specialist in heavier stock removal, such as welds on fabricated work, smoothing flame-cut edges, cleaning between teeth of gear castings, etc. — also for slotting, notching and cutting-off.



BF — Mounted Wheels and Points have the same strong laminated construction as the larger BF wheels. For polishing die cavities, chamfering, Brinell spotting, etc. For hand finishing, use BF sticks.



BFR — Excels at the lighter portable jobs, such as rust and scale removal, light weld grinding, scarfing and beveling, blending contours, notching gates and risers.

W-1636

NORTON

*Making better products...
to make your products better*

and Its BEHR-MANNING division

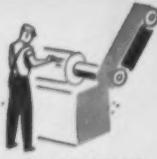
NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories

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Down



MANUAL



SEMI-AUTOMATIC

with



AUTOMATIC



SELF LOADING & UNLOADING

tools

...and now the NEWEST

AUTO MOTION®

MACHINES THAT THINK FOR THEMSELVES

Moving ever forward in the development of new gear-hobbing methods, Lees-Bradner now presents a hobber that *electronically* corrects tolerances while the machine is in action.

The secret lies in an "electronic brain" that checks the finished gears as they come from the hobber and makes corrections as necessary in pitch diameters or root fillets by electrically shifting the hob between cycles.

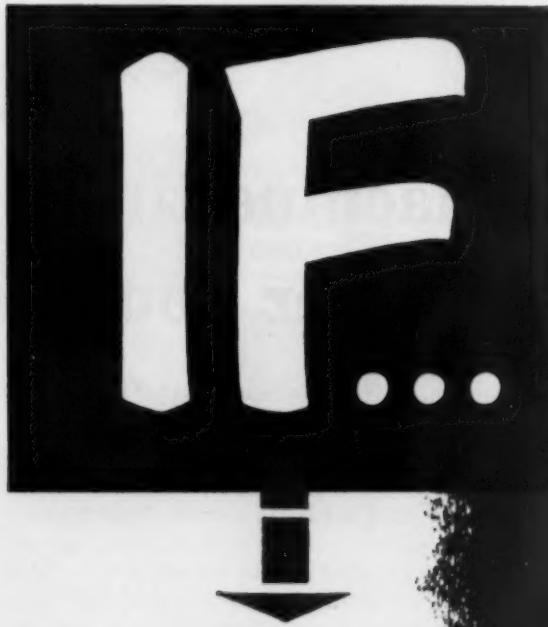
This is truly a revolutionary step forward in gear hobbing efficiency . . . time-saving as well as money saving.

If you, too, want to stop manufacturing "scrap" in your hobbing operations by catching off-tolerance pieces *before* they're hobbed, get the whole story from your Lees-Bradner representative. Or, write to us direct.

the LEES-BRADNER

CLEVELAND 11, OHIO - U.S.A.

Company



- You are spending too much time getting tool to and from an operation
- You are having trouble controlling action under tension
- You need a more precise operation to control scrap
- You need hair trigger control of quantity and size
- You want to start and stop your production line faster
- You would like to leave your production line virtually unattended hour after hour
- You require re-acceleration of a motor to previous exact speed
- You want centralized control
- Your mechanical transmission parts wearing out or getting out of adjustment

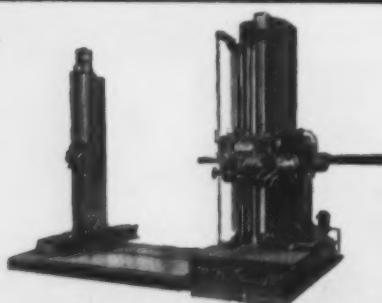
Or if you have other motor-drive problems, our sales engineers are prepared to give you the benefit of our 50 years' experience. Just get in touch with your nearest Reliance district sales office, or write to *Applied Engineering Division, Reliance Electric & Engineering Co., 1083 Ivanhoe Road, Cleveland 10, Ohio; Canadian Division, Welland, Ontario.*

L-1488

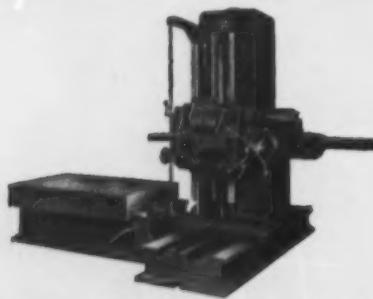


RELIANCE ELECTRIC AND
ENGINEERING CO. •

Builders of the Tools of Automation



Floor type with bed plate and boring bar support. Used in shops where workpieces are large, weighing as much as 20 tons. Stationary or adjustable tables can be attached to the bed plate.



Floor type with large table, adjustable either by hand or power. The Gilbert machine can be rail mounted to increase operating range and flexibility.



Large Gilbert floor type horizontal boring mill equipped with a duplicating attachment for spindle. 3 1/4" spindle, 96" vertical travel of spindle head, 120" horizontal travel of column on runway.

Specification summary	floor type
Spindle diameter	3 1/4" or 3 3/4"
Continuous feed to spindle	30"
Vertical travel of spindle head	36"-96"
Horizontal travel of column	48"-168"
Drive motor, hp	7 1/2 or 10HP

sell machine time for less per hour

You can sell your machine time for much less per hour if your machine is a Cincinnati Gilbert boring mill.

Take the floor type Gilbert, for example. Combine the basic machine with one of Gilbert's many workholding units, and you can do as many operations as you can do on equipment costing many times more. With the revolving-column Gilbert, you can even mill cavities with straight sides or reverse curves without resetting work. If you wish, the Gilbert mill can be adapted to workholding equipment or runways already in your shop.

Ask for a proposal; you'll see that it pays to replace with a Gilbert. New literature will be sent at your request.

Those who buy Gilbert buy Gilbert again



GILBERT

RADIALS • BORING MILLS • ACCESSORIES

THE CINCINNATI GILBERT MACHINE TOOL CO., 3366 BEEKMAN ST. • CINCINNATI 23, OHIO

use 'dag' dry films for trouble-free lubrication



dag
DISPERSIONS



**You can
double the
service life of
steel forging dies**



Treat your steel forging dies with 'dag' Colloidal Graphite and increase the number of acceptable forgings per die by as much as 100 percent. The *dry lubricating film* formed by colloidal graphite protects both dies and forgings. Freedom from scaling and sticking often eliminates some of the usual finishing operations on forgings, and greatly extends die life.

'dag' Colloidal Graphite is much more effective than ordinary high-temperature lubricants, including the best of powdered graphite. It is high-purity, electric-furnace graphite, specially treated by Acheson to produce microscopically fine particles. Dispersed in many fluid carriers for convenient application, 'dag' Colloidal Graphite will not burn, flake, or gum, at temperatures commonly encountered in metalworking operations.

'dag' dispersions are used profitably in stamping, deep-drawing, piercing, casting, forging, stretch-forming, and wire drawing. You'll find a surprising number of ways to use 'dag' dispersions described in our free booklet on 'dag' Colloidal Graphite for Metalworking Operations. Write for Bulletin No. 426-T2.

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of carriers.

ACHESON COLLOIDS COMPANY

PONT HURON, MICHIGAN

...also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND





We'd like to show our vertical tube vertically. Do you mind turning the magazine?

A better way to apply heat to metal

When metal needs heat, Lindberg furnaces with the new Lindberg light-weight vertical radiant tube offer a better way to apply it. Industry the world over is finding that Lindberg furnaces with this new vertical tube provide advantages no other type of furnace can give.

Whatever type or size of furnace fits your production needs, from gigantic continuous pusher-type to the small batch-type furnace, Lindberg engineers can develop exactly the right equipment for you, embodying all the advantages of this revolutionary new vertical radiant tube.

**The Lindberg vertical tube
gives you these advantages**

Typical Lindberg Vertical Tube Furnaces



Improved Performance

Because of Lindberg's revolutionary design, this tube (patent applied for) provides a new level of furnace performance. The secret lies in the new

**this
Lindberg
Vertical
Radiant
Tube
increases**

Lindberg gas-fired vertical radiant tube carburizing and carbonitriding furnace. The Lindberg vertical tube is ideal for these heat treating processes which require rapid uniform heating.

furnace efficiency and lowers costs

Lindberg tube's "dimples." Here's how they work—in the radiant tube a central stream of mixed air-and-gas is surrounded by a cylindrical stream of air alone and combustion occurs in the area between these two streams. The "dimples" create eddies in the streams accelerating combustion and maintaining even temperatures along the entire tube.

Maximum Dependability

This Lindberg tube will operate at maximum efficiency for a longer period of time. The special green silicone enamel, a Lindberg exclusive, gives greatest possible resistance to carbon penetration and greatly prolongs tube's operational life. Vertical position eliminates soot deposit inherent in horizontal tubes with resultant temperature increases at points of sooting. Lindberg tubes work effectively longer.



Lindberg vertical
radiant tube pit carburizing furnace. Note
small amount of space required for tubes.



Small Lindberg vertical radiant tube gas-fired hydraulic pusher type carburizing furnace. In this installation heating chamber is only 10 inches high.

New Economy in Operation

With Lindberg vertical radiant tubes the bulk and bend problems of old-fashioned horizontal tubes are eliminated. Tubes are just 59 inches long and weigh only 29 pounds. No costly furnace shut-downs and no high labor and material cost for tube change. Turn off the furnace, lift out the old tube, put in the new one. Literally, a matter of minutes. Savings in space and fuel costs, too.

*This scale reproduction is
exactly one-fourth actual size.*



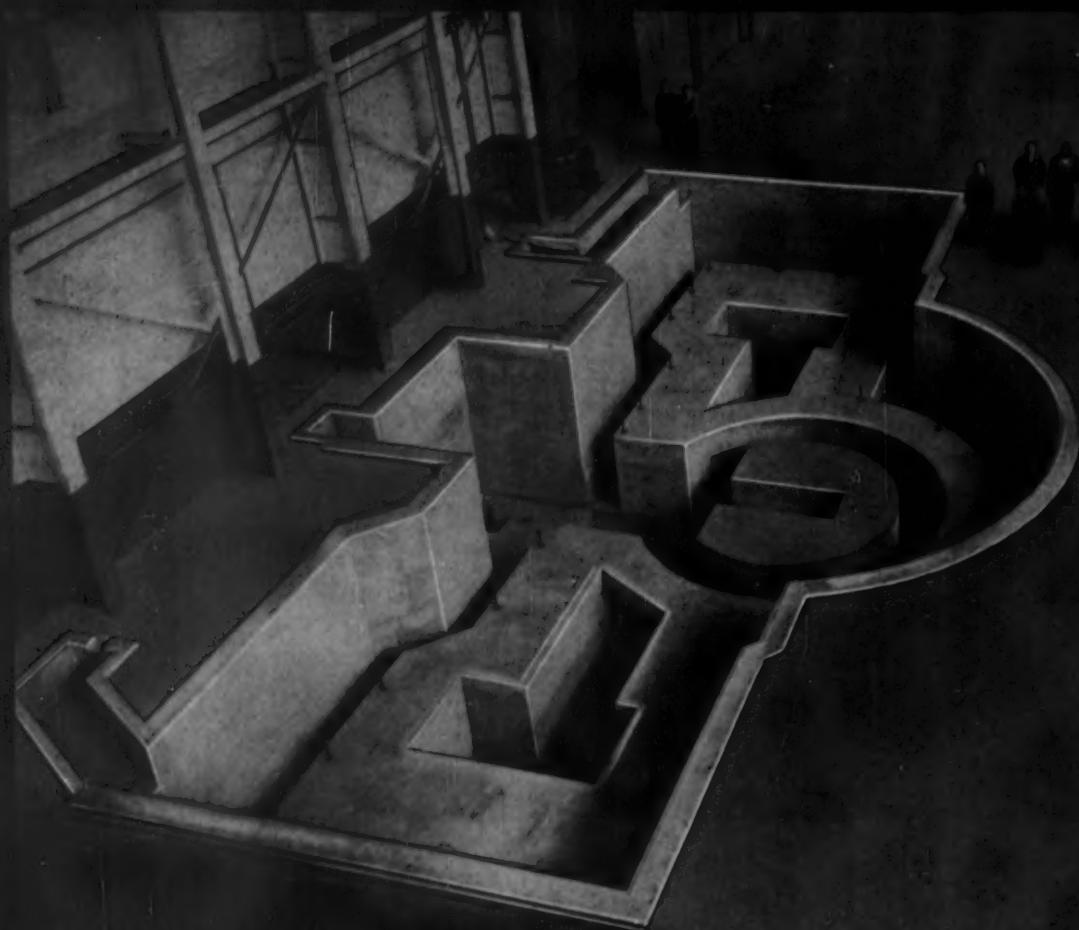
Lindberg Radiant Tube Batch Type Box
Furnace. Even small furnaces can be heated
efficiently with radiant tubes.

Lindberg Field Representatives in 21 cities are ready to work with you for the improvement of your heat treating processes. Consult classified section of phone book or write us direct.

LINDBERG ENGINEERING
COMPANY

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Los Angeles Plant: 11937 South Regentview Avenue, El Segundo, California

Now You Can



Foundation for the Betts 42 foot Vertical Boring and Turning

CONSOLIDATED MACHINE TOOL



A DIVISION OF FARREL-

Build Them **BIGGER!**

The size of the equipment in your own shop need no longer limit the size of the products you build.

Consolidated is completing a two million dollar shop expansion program that will make some of the world's largest machine tools available to you for your own big work.

This program includes a Betts 42-foot Vertical Boring and Turning Mill, a Betts 96-inch Lathe with 50 feet between centers, a Sellers 10-inch Floor Type Horizontal Boring and Milling Machine with 12 feet of head travel on the column and 25 feet of column travel on the runway. The two new cranes in this big shop have a combined lifting capacity of 150 tons.

This equipment with Consolidated's other big tools and skilled workmen are available to you. You can now build your own products larger and we will help you do it.

Mill

COMPANY, ROCHESTER 10, N. Y.

BIRMINGHAM CO., INC.





IF YOU USE FABRICATING TOOLS

you should have
these new Cleveland
catalogs

SEND FOR YOUR COPIES TODAY!

(Please write on your company letterhead.)

- VERTICAL OPEN GAP PUNCHES and SHEARS
- HORIZONTAL PUNCHES
- ANGLE SHEARS
- BAR SHEARS
- BENDING ROLLS
- STRAIGHTENING ROLLS
- BENDING and STRAIGHTENING MACHINES
- ROTARY PLANERS
- WALL RADIAL DRILLS

FABRICATING TOOL CATALOG No. 9

Just completed, this catalog illustrates and describes the various types of Cleveland machines used in the fabrication of plates, bars, angles, beams, girders and other structural shapes.

Should you desire additional information on any of the machines you'll find in this book, we'll gladly furnish you with it promptly.

PUNCH and DIE CATALOG No. 12

Here you'll find a description of the Cleveland System of Standardization which allows you to use economical standard rather than costly special punches. Its outline of the proper care of punches and dies will help reduce your replacement cost. It lists and illustrates all standard and special Cleveland Punches and Dies available for every make of punching machine and press.

AA-577

We take pride in our 75 years of machine tool building. We believe that our years of experience assure you of the utmost in dependable and economical performance from every Cleveland machine whether special or standard.



THE
CLEVELAND
PUNCH & SHEAR WORKS CO.

Established 1880

POWER PRESSES - FABRICATING TOOLS

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CITY FOUNDRY DIVISION • SMALL TOOL DEPARTMENT





dependable!

WEIRTON

high carbon strip cold-rolled spring steel

for high-speed blanking or forming

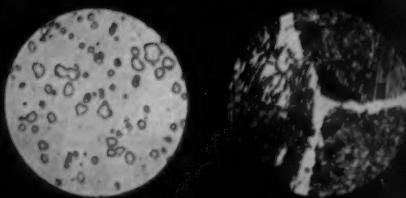
Where high fatigue-resistance is a principal factor, Weirton cold-rolled spring steel furnishes high carbon strip in the consistent uniformity necessary to meet the most exacting requirements of a wide variety of products. The close manufacturing control featured at Weirton results in several unique and highly desirable qualities—such as accurate response to heat treatment . . . uniformity of gauge and width . . . uniform chemical and physical properties . . . exact consistency of grain structure . . . controlled decarburization limits.

Pearlitic and spheroidized structures are available with desired chemical analyses and for specific heat treating and hardness. When you call Weirton you call for easier blanking and cold forming. And, at Weirton, you get what you call for.

WEIRTON STEEL COMPANY

Weirton, West Virginia

NATIONAL STEEL CORPORATION

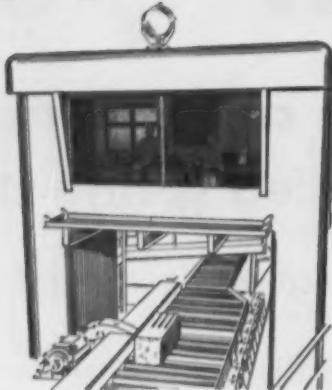


The photomicrograph on the left illustrates Weirton high carbon strip that has been spheroidized and annealed—soft and ductile—ideal for cold-forming operations. The one on the right shows the pearlitic steel structure, temper-rolled in controlled hardness and strength for clean, economical blanking procedure.



Now... EC&M

AUTOMATIC-POSITIONING Control sets blooming mill screwdowns to *pin point* accuracy . . .



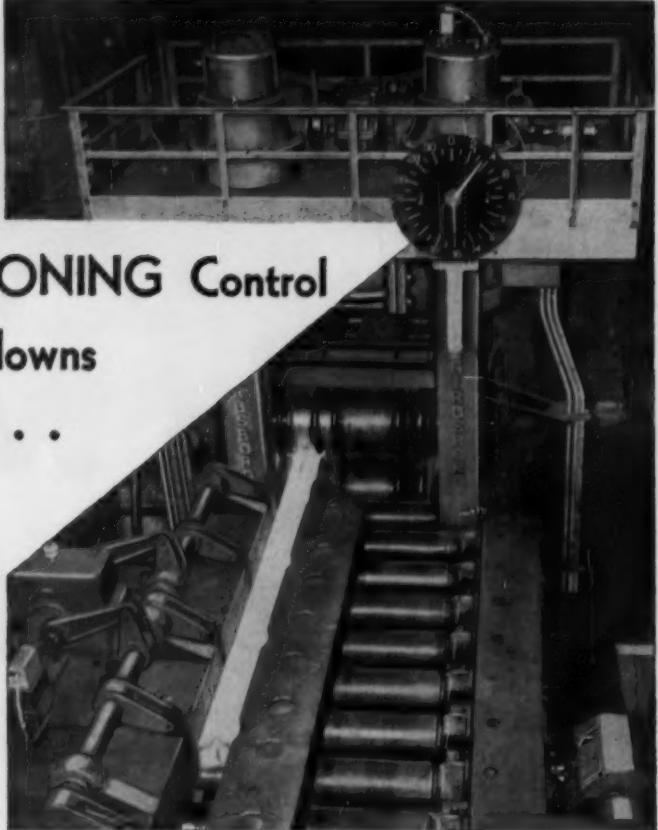
Reduces roller's tasks 1/3

• • •

New operators learn
faster

• • •

Accurate drafts reduce
rejections



Indexes *automatically* from pass to
pass to speed rolling and cut costs . . .

To meet the challenge of ever-increasing costs, rolling mill management-teams are turning to automatic operation of screwdowns and associated drives. Precise roll drafts give a higher quality product and new operators become seasoned in a shorter time. Removing the need to coordinate the screwdown with mill reversal enables the roller to concentrate on the manipulation of main motor and work tables for faster and more efficient operation.

The roller pushes a momentary-button only once for each pass, and the rolls are driven to the exact pre-selected settings . . . no overtravel with subsequent inching into position. The operation is entirely automatic for each complete rolling schedule.

This EC&M Automatic-Positioning Screwdown Control system is readily applied to ferrous and non-ferrous mills. New Booklet 9250 fully describes this control and shows many interesting installations. Write for your copy.



On plate mills and roughing stands, edger rolls
and side guide movements can be automatically
coordinated with screwdown movements.



THE ELECTRIC CONTROLLER & MFG. CO.

4498 Lee Road • Cleveland 28, Ohio

6187

If you're eating your heart out over polishing costs--read this!



Skyrocketing enthusiasm of America's homeowners for high-quality solid-brass lighting fixtures created a temporary bottleneck in the polishing room of Globe Lighting Products, Inc., one of the leaders in the field. This production problem coincided with the introduction of Formbrite* to the metal-working industry a couple of years ago.

Globe's acceptance of this easy-to-polish fine-grain drawing brass was immediate and enthusiastic. Results were highly successful from the very beginning. Work pile-ups in the polishing room were eliminated and polishing costs were cut in half on many items (see typical examples below). In addition, Globe learned, as have many others, that Formbrite provides a more lustrous finish—is harder, stronger, springier and more scratch-resistant, yet has remarkable ductility for forming and drawing operations.

Surprisingly, Formbrite doesn't cost a penny more than ordinary drawing brass. Why not pass the good news along to those who head up your engineering, design or production departments? Ask them to write for booklet B-39 . . . or phone for a sales representative . . . or request a free sample of Formbrite to try in your own shop. Address: The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

SS80

*Reg. U. S. Pat. Off.

Parts illustrated are approximately three-quarters actual size.

48% saving

5/16 x .062" round-edge Formbrite strip in this scroll eliminated a before-bending polishing operation.

45% saving

After forming, this Formbrite channel edging is simply bright-dipped, color buffed, degreased, lacquered. That's all!

26% saving

Tens of thousands of these drawn canopies, socket cups, etc., have been made of time-and-cost-saving Formbrite.

55% saving

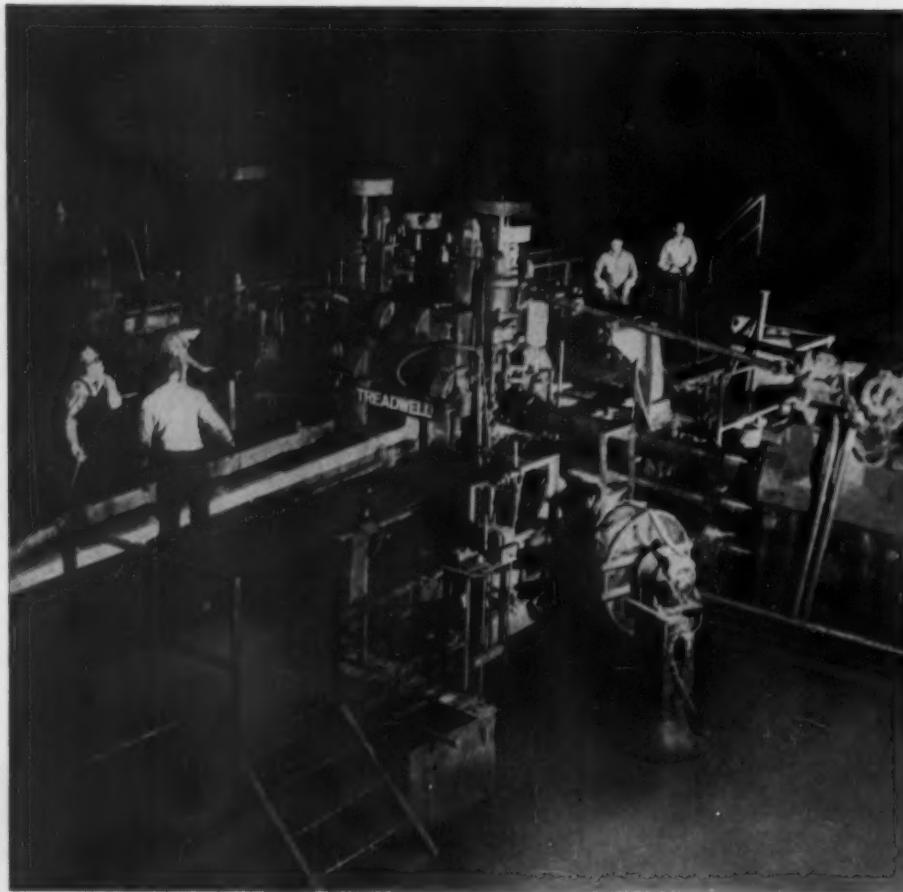
This hard-to-handle ornamental banding now gets only a simple color buff, saving as much as the cost of the metal.

Formbrite

FINE-GRAIN DRAWING BRASS
an ANACONDA product

made by The American Brass Company

Treadwell



Manipulators, Mill, etc.

Mills, Blooming & Billet

Mills, Merchant & Bar

Mills, Rod

Mills, Sheet

Mills, Strip (Cold)

Mills, Strip (Hot) & Skelp

Mills, Vertical Edging

Tables, Mill

Tables, Tilting & Lift

Tables, Transfer

Transfers

Coilers & Reels

Conveyors, Coil

Drives

Electors, Furnace

Gauges, Shear, Saw, etc.

Beds, Cooling

Beds, Inspection

Bumpers, Furnace

Pushers, Furnace

Repeaters

Handling Equipment (Kick-offs, Pliers, Cradles, etc.)

Steel and Iron Castings

Ni-Hard and Ductile Iron

Castings

Three-High Mill for rolling precision rounds and squares up to and including 5" round or square. The mill is equipped with motor operated screw-downs for both top and bottom rolls.



Treadwell Engineering Company

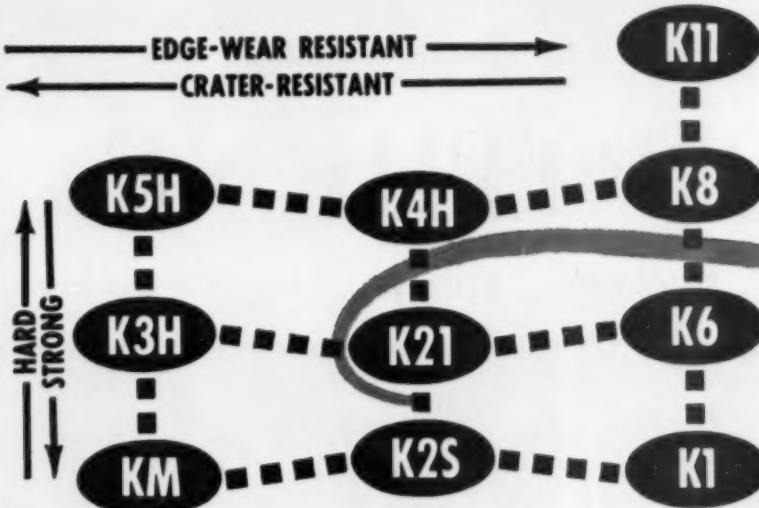
EASTON, PA.

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Use Grade K21—the NEW Kennametal* General Purpose Steel-Cutting Grade

The Grade Selection Guide (above), which groups Kennametal grades according to strength, hardness, and wear characteristics, pinpoints the *new* K21 as a medium grade for general purpose steel-cutting applications. It is stronger than K5H, K4H, and K8. It has greater edge-wear resistance than K3H and KM, and more crater resistance than K11, K8, K6, and K1. Thus, K21 is for moderate, as well as heavy roughing of scaly, abrasive steel castings and forgings, and for interrupted cutting and milling operations requiring high resistance to edge wear, to cratering, and to shock. K21 shows exceptional performance on modern high-speed machines, and, due to its range, does an excellent job on older, slower-speed machines as well.

Because of this performance, K21 is rapidly becoming recognized as the leader of all general purpose steel-cutting grades. It's a premium grade at no extra

cost. Ask your Kennametal Representative for performance facts; and for a copy of the Grade Selection Guide shown above . . . it's the most simple system of selecting the right grade for every job that has ever been developed.

Kennametal Engineers are ready to help you

Every Kennametal Representative is a tool engineer. He is trained to help you analyze tool wear—apply the right tool and grade to the job—establish proper lathe speeds and feeds—train machinists to get increased production at the lowest possible cost with Kennametal Tools. In addition to his own broad experience, he has available to him the backgrounds of 150 other Kennametal Tool Engineers. His office is listed in the classified telephone directory in principal cities. Call him, or write KENNAMETAL INC., Latrobe, Pa.

* Registered Trademark



INDUSTRY AND
KENNAMETAL
...Partners in Progress

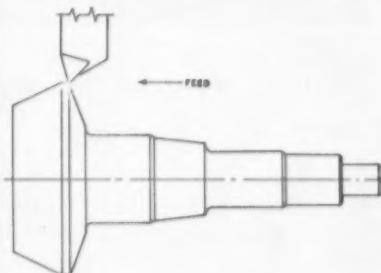


Shows Exceptional Wear Resistance



Grade K21, on the left, shows less wear than competitive grade (at right) after turning 100 pieces.

Four competitive grades of cemented carbides were used in a recent comparative test machining SAE 4620 rear axle drive pinion forgings. (See drawing below.) Each grade was removed for examination of the cutting edge after turning 100 pieces. The competitive inserts showed sufficient wear to require indexing to a new cutting edge, while the Grade K21 insert (at left above) turned 200 additional pieces before it was indexed. This 3 to 1 ratio in tool life typifies the results being obtained on many types of machining jobs with this *new* Kennametal grade, including forgings, sandy castings, centrifugal castings, plate, weldments and highly abrasive silicon steels.



VISIT US AT THE
MACHINE TOOL SHOW
Chicago, starting Sept. 6, 1955
Booths 410-411, Navy Pier, and
Booth 123, Chicago Amphitheater



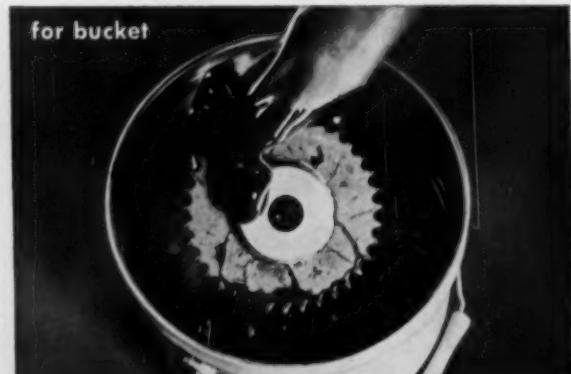
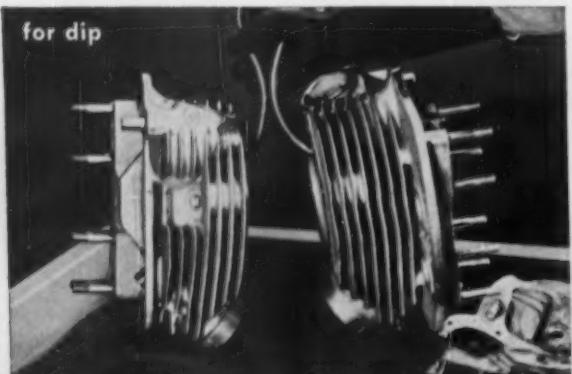


DOW... industry's most complete line of chlorinated solvents

Dow

CHLOROTHENE

for dip... bucket... spray... wipe



Get high-solvent-power cold degreasing plus all this
SAFETY... low toxicity, no flash or fire point

Chlorothene† is described by enthusiastic users as "The best general-purpose cold degreaser we've ever found—by far the *safest*—and the *easiest* to use." Chlorothene (Dow 1,1,1-Trichloroethane, Inhibited) removes greases, oils, tars, waxes and other contaminants with the cost-saving *speed* of carbon tetrachloride and with a much greater degree of *safety* (M.A.C. for carbon tetrachloride is 25 ppm., whereas the M.A.C. for Chlorothene is 500 ppm.). And you get superior protection from *fire hazards* present with petroleum solvents: Chlorothene is certificated* for use as a ships' stores article by the U. S. Coast Guard. All common metals, including aluminum,

can be cleaned with relative safety from corrosion.

Versatile, easy handling Chlorothene is made exclusively by Dow. Contact your local Dow distributor today for a supply. And don't forget that he can meet all your *vapor degreasing* solvent needs, too, with stabilized Dow Trichloroethylene and Perchloroethylene. If you're in doubt about how to reach your Dow distributor, or would like more detailed Chlorothene information, write direct to THE DOW CHEMICAL COMPANY, Dept. S 669C, Midland, Michigan.

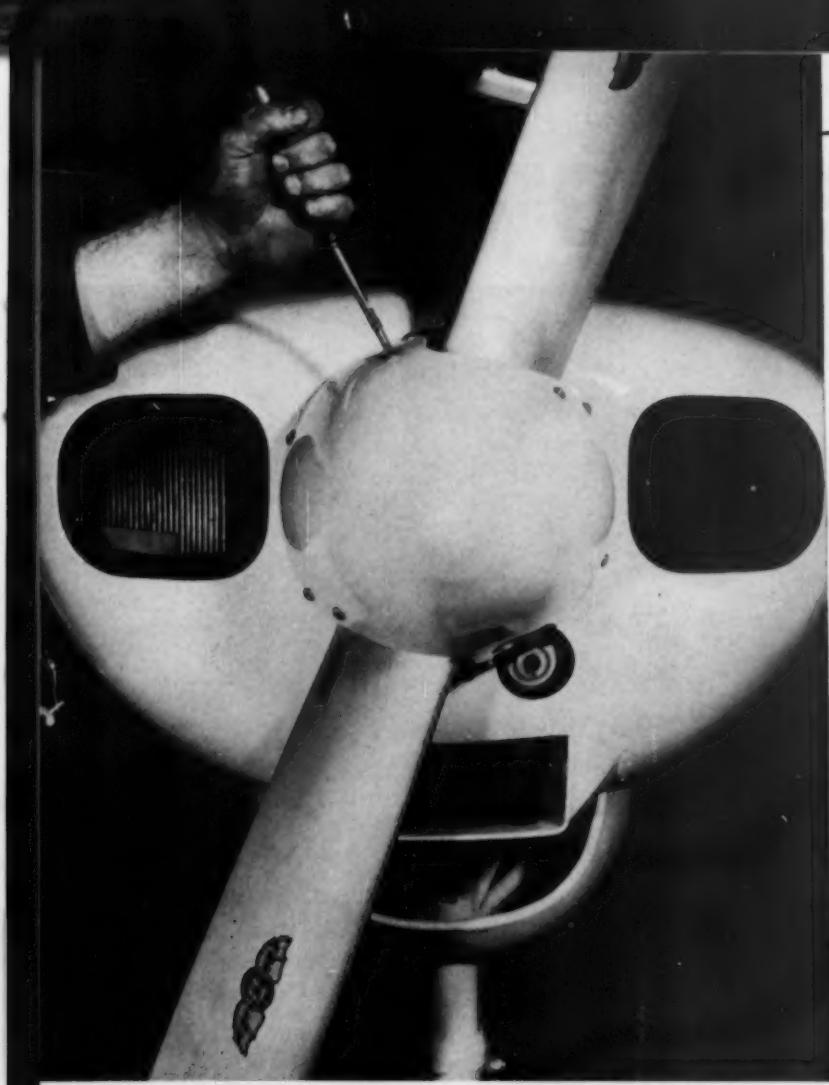
#202

26 April 1955
Certificated for use as an article of stores on board vessels. This certificate covers only hazard in the use of this product. The efficiency of this product is not passed upon. U. S. Coast Guard.

†Trademark

you can depend on DOW SOLVENTS

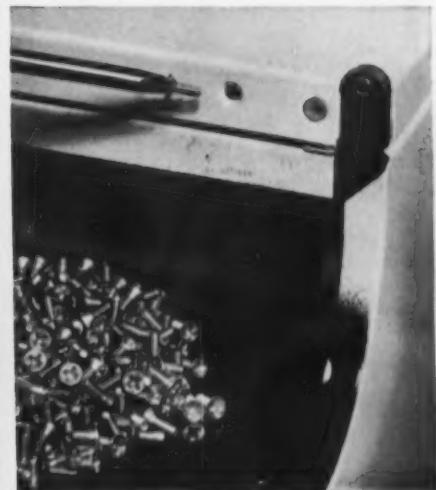




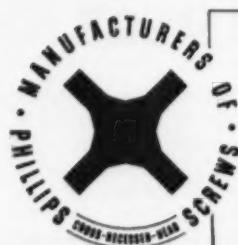
"PROTECTION AGAINST SLIPAGE is the main reason why we use Phillips screws at Piper Aircraft," says the methods engineer. A slip of the driver in this photo could cause the spinner to be taken off and repainted. But there is no fear of slippage because Phillips drivers securely seat themselves.

SWIFT, SURE ASSEMBLY

... with Phillips
Cross-Recessed-Head Screws

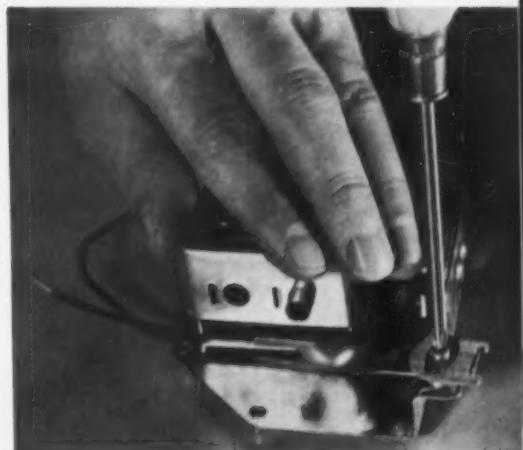


"SWIFTER ASSEMBLY, more contact and driving power with Phillips screws have enabled us to use production methods which were impossible with other type screws," says the general manager of Tracy Kitchens. Shown here is a closeup of 6-32 x $\frac{3}{8}$ " Phillips flat head screws securing the door of an under-sink cabinet.



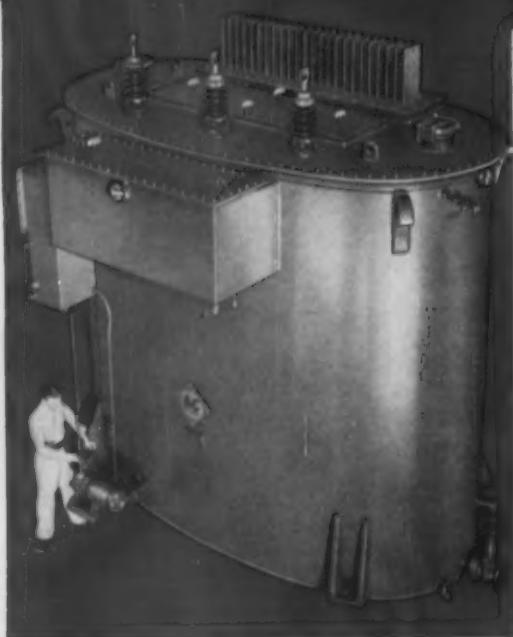
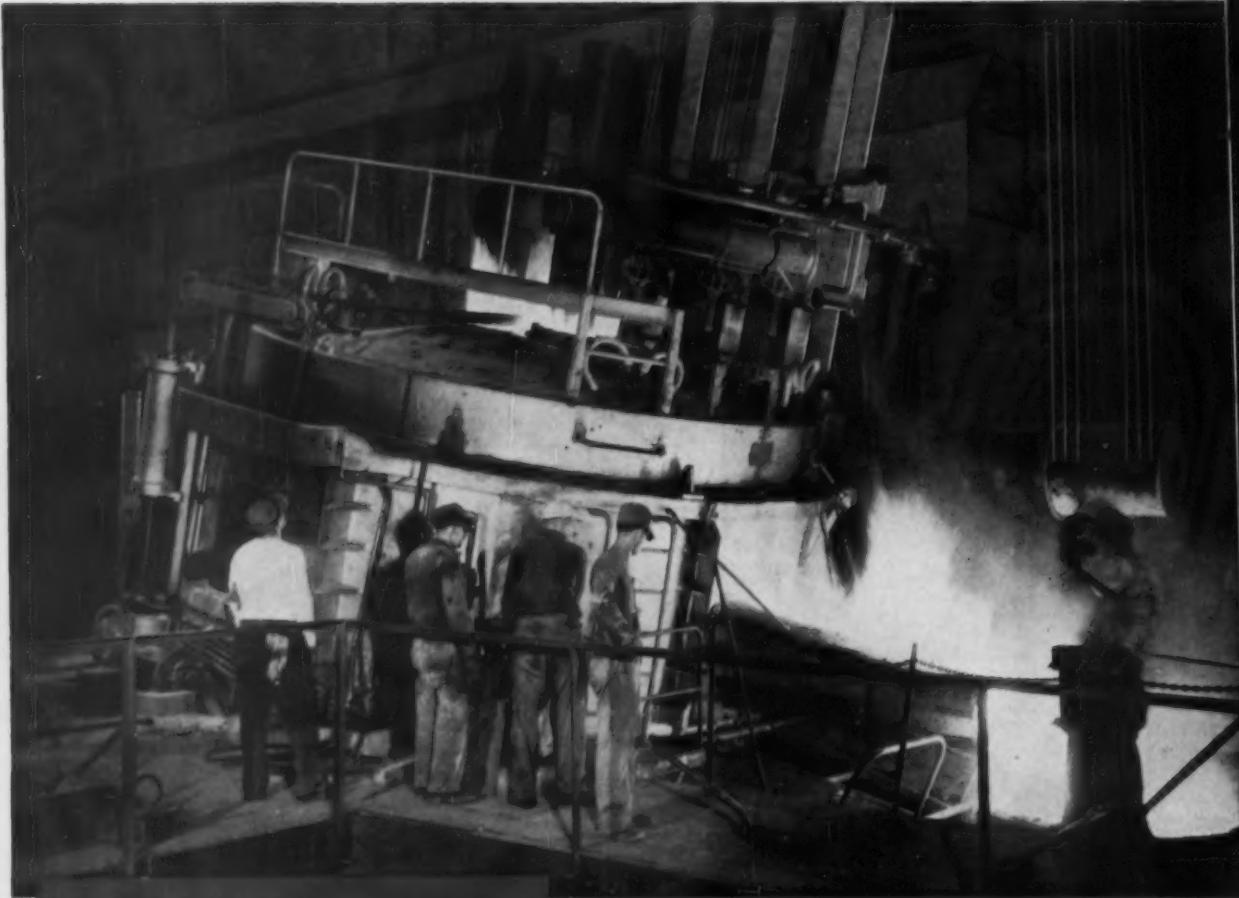
THE FASTENERS OF TODAY...
AND OF THE FUTURE
X marks the spot
the mark of extra quality

Allmetal Screw Products Company, Inc. • American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Company • The Eagle Lock Company • Elco Tool and Screw Corporation • Great Lakes Screw Corporation • The H. M. Harper Co. • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Co. • Parker-Kalon Div. General American Transportation Corporation • Pheoll Manufacturing Company • Rockford Screw Products Company • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hardware Manufacturing Company • Sterling Bolt Company • Universal Screw Company • Wales-Beech Corporation



"A BETTER LOOKING FIXTURE is obtained by the use of Phillips cross-recessed-head screws on our 8-Tone chime," says the chime engineer of Nutone Incorporated of Cincinnati, Ohio. "If screws must be used on the exterior of any unit, I definitely feel Phillips recessed head screws are the very best choice."

Reduce Cost of



TRANSFORMERS

Well-balanced design and extra-heavy duty construction are used in the Allis-Chalmers arc-furnace transformer. Past records show ability to withstand as much as 25 to 30 years of the repeated daily short circuits encountered in furnace operation. Extremely heavy supports and structure are used to brace coils against the severe short-circuit stresses.

Skillful insulation techniques protect windings from overvoltage due to wide tap range. Some units are designed for as much as 50% range in secondary voltages. Tap-changing mechanism, specially designed for arc-furnace transformers, is in separate compartment to facilitate maintenance. Wide flat contacts provide the long life needed for numerous daily tap-changing operations.

ALLIS-

Arc-Furnace Steel

Use Allis-Chalmers Integrated Electrical Equipment—and you...

SAVE on Engineering — Allis-Chalmers steel mill specialists coordinate equipment, submit single complete package proposal.

SAVE on Purchasing — One order, one invoice, one follow-up for the complete furnace electrical system.

SAVE on Installation — All components are matched for easy installation. Delivery is coordinated to prevent delays.

SAVE in Operation — All equipment is designed and built to work together. One reliable supplier guarantees performance of complete electrical system.

TAKE ADVANTAGE of Allis-Chalmers complete line of arc-furnace equipment—transformers, *Regulex* control, switchgear, associated controls—backed by 45 years of experience. Call your nearby Allis-Chalmers District Office for assistance when you are planning new facilities or modernization. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Regulex and Ruptair are Allis-Chalmers trademarks.

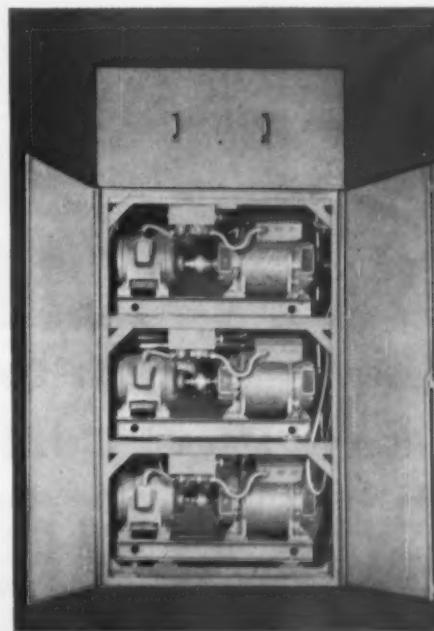
A-4742

REGULEX CONTROL

Balances arc current with arc voltage almost instantly—maintains desired arc conditions by automatically varying distance between electrode and charge.

With *Regulex* rotating amplifier there are no contacts or switching devices between the regulator and electrode motor. Continuously closed circuit provides constant positive control, minimizing current surges, cutting power consumption.

Simple design of *Regulex* results in lower maintenance. Provisions for spare unit mounted on top assure continuous operation under all conditions. Tier construction—open or enclosed—conserves valuable floor space.



Other

Allis-Chalmers
Equipment
for the Steel
Industry



Wide Range of Motors for main mill and auxiliary equipment drives—ac or dc—from 1 hp to 10,000 hp—and supporting m-g sets or rectifiers.



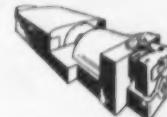
Transformers for mill service include metering transformers, distribution transformers, power transformers, and unit substations.



Switchgear ranges from low voltage metal-enclosed units to large metal-clad types—includes Ruptair and oil circuit breakers. Also large power circuit breakers.



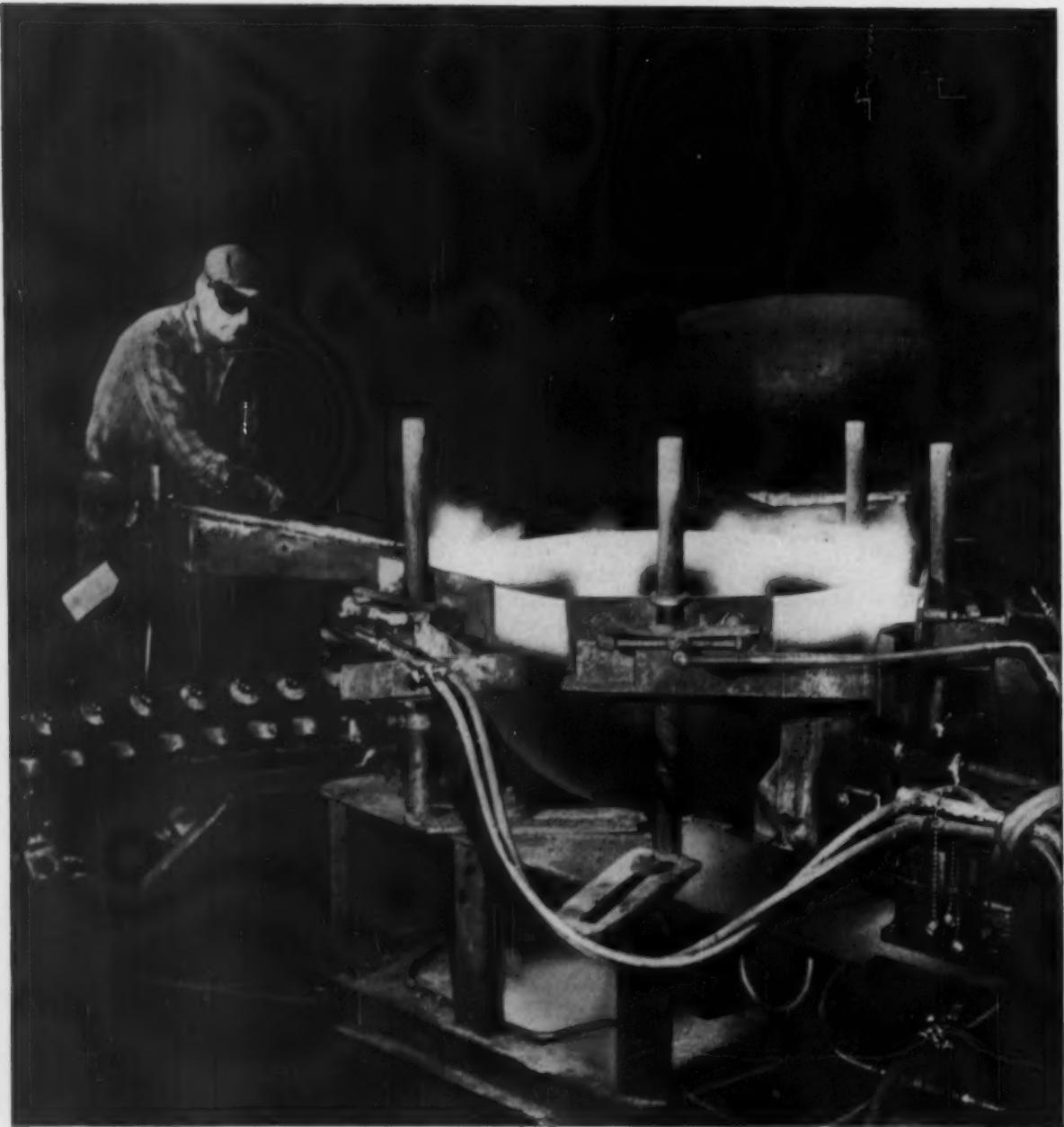
Blast Furnace Blowers are a part of the A-C line of single and multi-stage blowers, axial and rotary compressors, and vacuum pumps for the steel industry.



Power Generation Equipment includes steam turbine-generator units 2000 kw and larger for fluctuating steel mill loads. Also condensers, pumps and auxiliary-drive motors.

CHALMERS





GAS gives new strength to tank heads at Lukens Steel Company

Lukens Steel Company, Coatesville, Pennsylvania, makes a complete line of heads for high pressure LP-Gas storage tanks. For economy reasons, these heads are cold pressed. But cold pressing leaves brittle areas on the head rim. When heads go through the "bumps" and "bangs" of tank assembly, breaks occasionally develop in the brittle area around the head rim.

Lukens solved the problem by stress relieving the heads with Gas. An assembly line conveyor brings the heads to a

special Gas-fired machine where a battery of burners stress relieves the entire periphery of the $\frac{1}{4}$ inch thick head rim. As a result, there are no more brittle areas in the rim. And there are no more breaks during assembly operations.

When you have a problem in your production line involving heat processing, call your Gas Company Industrial Specialist. He'll be glad to discuss the economies and results you can expect from using Gas and modern Gas-fired equipment. *American Gas Association.*

carbides?

IMPELLER HUB — 4" diam., 1 1/4" long, from SAE 1146 annealed steel forging. JOB ANALYSIS determined multiple-spindle chucks with ALL CARBIDE tooling.

11 operations on first side, on 6" Acme-Gridley 8-spindle chucker with double indexing and duplicate tooling. 2 pieces per cycle in 22 1/2 seconds machine time — 320 pieces per hour.

17 operations on other side on single indexing 6" Acme-Gridley 8-spindle chucker. 26 seconds machine time — 138 pieces per hour.



high speed?

SEAL RING — 1/2" thick, from 2 1/2" diam. steel 6150 annealed. JOB ANALYSIS classed this as single-spindle job with HSS tooling.

5 shoulders rough and finish-formed to .0002 tolerance, seat diam. held to .0005 tolerance, on 3 1/2" single-spindle Acme-Gridley bar-type turret lathe. 7 minutes machine time — 8 (plus) pieces per hour.

Spindle speed automatically changed 4 times during cycle to provide suitable speeds and feeds for required finish.



or BOTH?



SHAFT — 7 1/4" long, from 1 1/8" diam. steel 6250 annealed. JOB ANALYSIS indicated single-spindle bar-type turret lathe, with part CARBIDE and part HSS tooling.

10 operations including deep forming, turning and form-turning on 3 1/2" single-spindle Acme-Gridley bar-type turret lathe: 5 minutes 46 seconds machine time — 9 (plus) pieces per hour.

5 automatic changes of spindle speed during the cycle provided speeds and feeds best suited for using both HSS and Carbide tools.

let the job analysis
dictate the
right tooling method

(And the Right Machine)

All Acme-Gridleys are built with a rigidity factor to withstand the pressure of *any* cutting tool yet devised—at speeds as fast as modern cutting tools can "take it." With such a margin of power, speed and stamina built into each of National Acme's COMPLETE LINE of multiple- and single-spindle bar and chuck-type automatics, you can safely let the job analysis dictate:

1. The best tooling method.
2. The machine best suited to produce the job most economically.

And you can be equally sure that tooling recommendations from National Acme will be based upon sound, experienced judgement.

If you would like a complete job analysis, we'd be glad to give you the benefit of our experience.



BOOTHS 324 AND 705

You can see National Acme's COMPLETE LINE IN ACTION at the Machine Tool Show. Study these modern machines. Ask questions. Then you'll learn why Acme-Gridleys are your best investment — for greater productivity today, and to maintain "new-machine-productivity" longer.



OUR JOB: to provide the *Right Machine* for YOUR JOB



Acme-Gridley 4, 6 and 8 Spindle Automatic Bar and Chucking Machines • Fully Automatic Turret Lathes (Bar and Chuck Type) • Hydraulic Thread Rolling Machines • Automatic Threading Tools • Switches • Solenoids • Contract Manufacturing.

THE NATIONAL
ACME COMPANY

175 EAST 131ST STREET • CLEVELAND 8, OHIO

ALL NEW

Lodge & Shipley

10" Hi-Turn LATHE

PERFECTED FOR PRODUCTION!

*...never before...so many features...
so much quality...at such low cost!*

- 9 color-coded speeds up to 3000 RPM and 5 HP
- Totally enclosed quick change gear box
- Dynamically braked motor in leg
- Template-type length stops, magnetic clutch operated
- Flame-hardened replaceable steel bedways
- Hardened and ground cross slide ways
- Direct reading cross feed and top slide dials
- Provision for rear tool block and multiple tools

The Lodge & Shipley 10" HI-TURN Lathe is a completely new concept in lathes. Establishing that lathes for high speed production rarely utilized lead-screws, Lodge & Shipley eliminated the leadscrew and its complicated gearing . . . added other features for high production and accuracy at low cost. The result is a rugged lathe of high efficiency at a price substantially lower than conventional lathes.

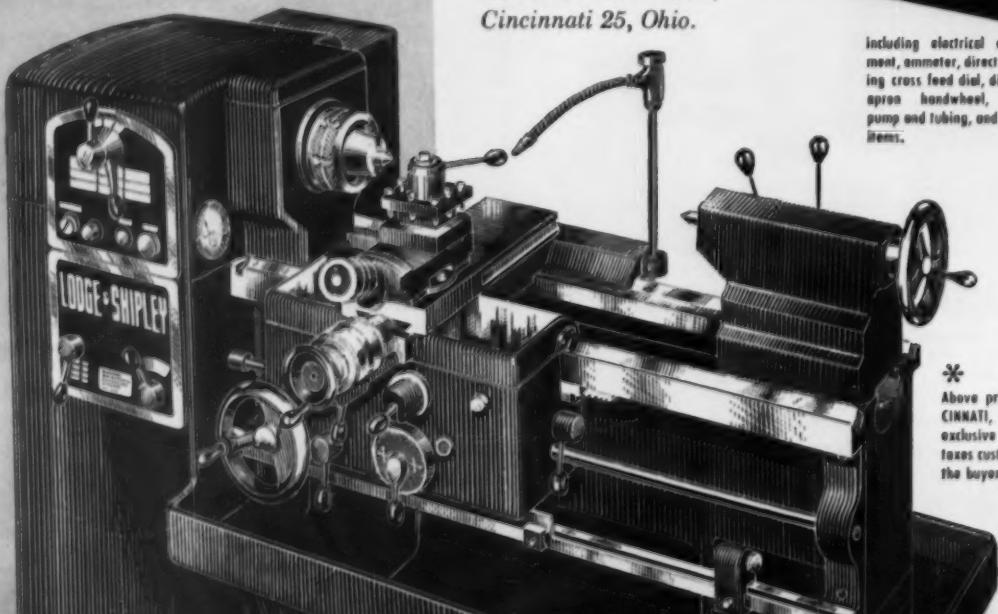
Write for detailed Bulletin 300,
The Lodge & Shipley Co.,
3055 Colerain Avenue,
Cincinnati 25, Ohio.

\$4,985*
only

including electrical equipment, ammeter, direct reading cross feed dial, dial for sprocket handwheel, pan, pump and tubing, and other items.

*

Above price is FOB CINCINNATI, OHIO and is exclusive of applicable taxes customarily paid by the buyer.



SEE IT NOW! and SEE IT AT THE MACHINE TOOL SHOW, SEPTEMBER 6-17



Three cheers for the red, white and cool

The "see-through" safety guard was specially made for this photo only.

Distinctive RED blotter on a new WHITE wheel is the sign of COOL tool grinding worth cheering about! And that's not all...V40 Bond Tool Room Wheels by CARBORUNDUM cut faster, last longer and permit heavier infeeds without burning the stock or overheating the tool, even

on die steels and hi-vanadium types. And the outstanding form-holding ability of V40 Bond Wheels eliminates costly stops for wheel dressing halfway through a job. Try one in your shop today. There's a type for every tool room operation...easily identified by the V40

on the bright red blotter. Your CARBORUNDUM Distributor or salesman will arrange a free demonstration. For Bulletin A-1310, write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

Through product quality and application "know-how"

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more **sense** in your abrasive **dollar**



**All work and some play
makes this a smart buy**

6,000-r.p.m. wheel speed is "stopped" by 1/10,000 sec. stroboscopic exposure. (The "see-through" safety guard was specially made for this photo only.)

Here's the perfect answer to all rough grinding problems. CARBOFLEX Depressed Center Wheels, with resilient fibre-reinforced construction, combine maximum cutting ability with maximum operator safety. Reduce or undercut heavy welds, clean up castings, rough off fins and sharp

risers...in record time, at less abrasive cost per wheel. CARBOFLEX Wheels are tops for cutting-off and slotting, too! Another outstanding feature: the back of the wheel, like its face, is knurled. You can cut with either side, plus the edge... without initial dressing. Call your

CARBORUNDUM Distributor or salesman today for a demonstration of this rugged production booster. For descriptive folder A-1272, write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Co., Ltd., Niagara Falls, Ontario.

Through application "know-how" and product quality

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more **sense** in your abrasive **dollar**

SPECIAL ANNOUNCEMENT

of particular interest

TO EXHIBITORS

at the 1955

MACHINE TOOL SHOW

To help you make the most of your exhibit, E. F. Houghton & Co. has been invited to serve you and other companies operating machine tools, hydraulic equipment and other types of machinery at the show.

We will be on hand before and during the exposition to supply you with the highly regarded Houghton products such as:

- ★ HOUGHTON FORTIFIED LUBRICANTS
- ★ HOUGHTON CUTTING FLUIDS
- ★ HOUGHTON METAL CLEANERS
- ★ HOUGHTON HYDRAULIC OILS
- ★ HOUGHTON RUST PREVENTIVES

To assist you further in keeping exhibited equipment operating smoothly and continuously to best

advantage, experienced Houghton engineers will be constantly on call during the show—and beforehand as well.

We will also maintain a Houghton service headquarters at the booth assigned to us by the Management, to discuss metalworking problems with the thousands of machine tool users who will attend. Those are the men we are serving in industrial plants over the nation.

To be sure to get the full potential out of your machines on display, we urge you to contact the Houghton Man, or write us at 303 W. Lehigh Ave., Philadelphia 33, Pa. We'll be glad to be of aid in any way we can.

HOUGHTON

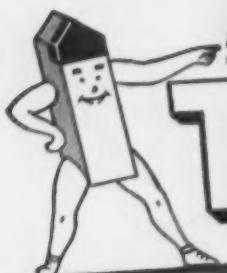
1001 PRODUCTS TO IMPROVE PROCESSING

July 14, 1955

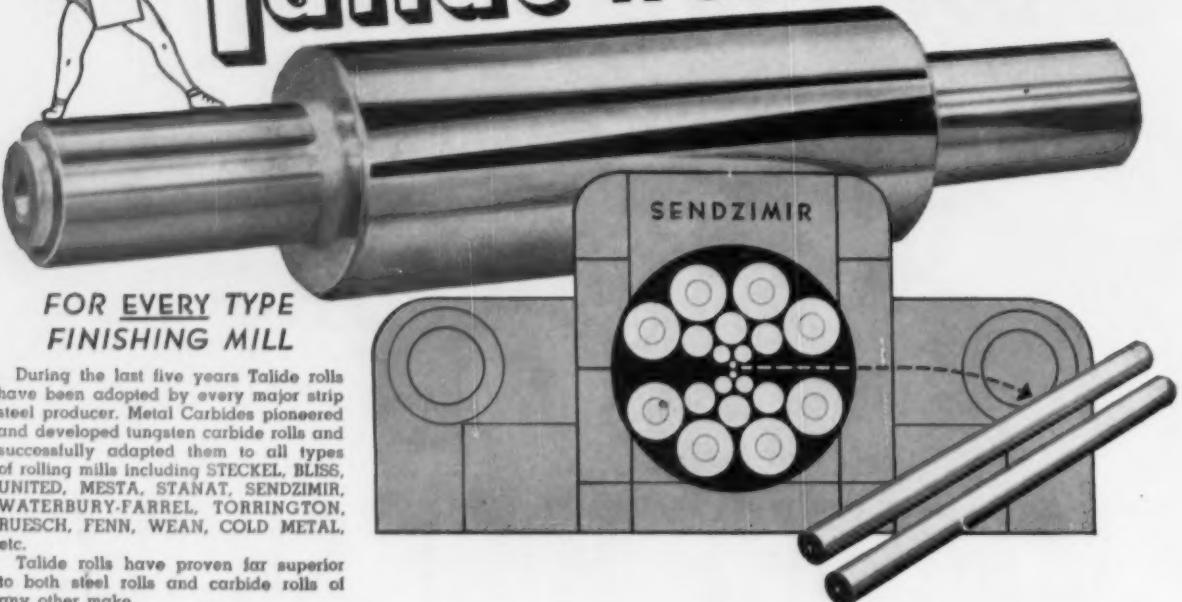


Ready to give you
on-the-job service . . .





ALL ROLLING MILLS NOW USE **Talide WORK ROLLS**



FOR EVERY TYPE FINISHING MILL

During the last five years Talide rolls have been adopted by every major strip steel producer. Metal Carbides pioneered and developed tungsten carbide rolls and successfully adapted them to all types of rolling mills including STECKEL, BLISS, UNITED, MESTA, STANAT, SENDZIMIR, WATERBURY-FARREL, TORRINGTON, RUESCH, FENN, WEAN, COLD METAL, etc.

Talide rolls have proven far superior to both steel rolls and carbide rolls of any other make.

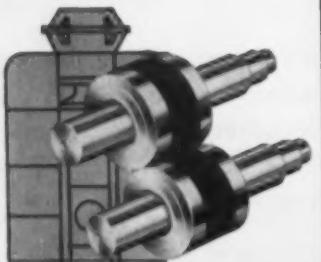
168 to 7 hours

Leading Ohio strip steel producer averages 750 coils of various types and analyses between grinds, enabling them to operate their cold rolling mill continuously without roll changes for 7 days, 3 turns per day. Previous steel rolls used averaged 6-8 hours, necessitating 3 or 4 roll changes per day with considerable downtime.



210 to 5 days

Large Mid-Western producer of chrome-nickel alloy flat wire is averaging 7 months' continuous service between grinds compared to 5 days average run with steel rolls. Among other advantages, customer reports improved surface finish adds to sales appeal of finished product, fewer anneals are required to produce desired reduction, and wire runs cooler, resulting in less oxidation.

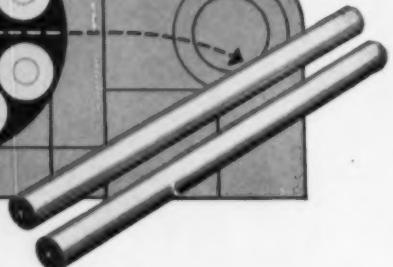
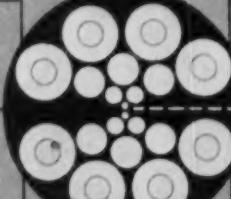


ROLL REPAIRING

Broken or damaged carbide rolls can be re-worked to first class condition with all defects eliminated at one-half original cost. Only Metal Carbides offers this service—because of its exclusive hot press method.

Send for new 84-page catalog 55-G

SENDZIMIR



Talide work rolls are ultra-hard, extremely dense, and porous-free. Manufactured from highest purity tungsten carbide powders, the surface finish of a Talide roll is smoother than one micro-inch. Hard as a diamond, it will take a "bigger bite" than a steel roll. Strip steel of all analyses can be rolled down to thinner gauge, with more accuracy, greater reductions and with fewer anneals than possible with any other roll.

All users of Sendzimir rolling mills have adopted Talide work rolls because operating results have been phenomenal, far surpassing all expectations. The higher initial cost of Talide rolls is offset many times by the very substantial savings realized in less downtime, fewer regrinds, reduced scrap, reduced strain and stress load on back-up rolls, bearings and mill housings.

Tremendous production runs are commonplace with Talide rolls with mill after mill reporting increased tonnage runs between roll changes of 278-1, 179-1, 82-1, etc. Metal Carbides Corporation, Youngstown 7, Ohio.



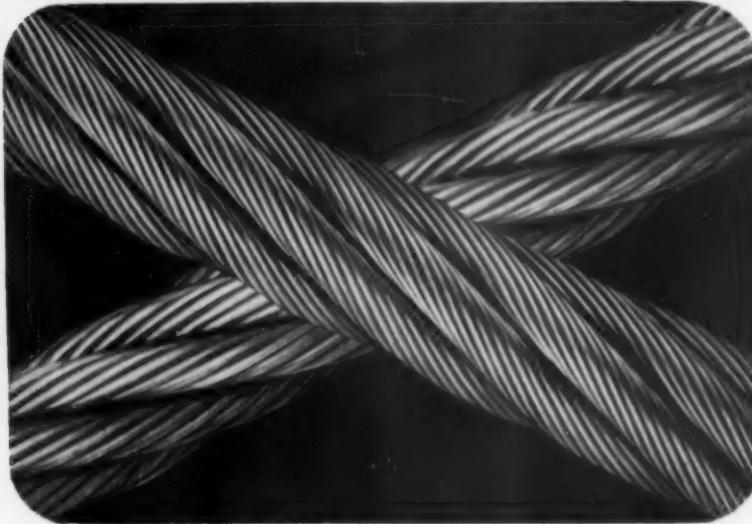
SPECIAL DIAMOND WHEEL for ROLL GRINDING

The Superset diamond grinding wheel was specially developed for grinding carbide rolls to highest possible surface finish and luster. Made of 4-8 micron size diamond dust, it imparts a surface finish far superior to any other commercial wheel. Available in sizes up to 25" diameter.



HOT PRESSED AND SINTERED CARBIDES . VACUUM METALS
HEAVY METAL . CERMETS . HIGH TEMPERATURE ALLOYS.
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY.

FIRST WE DEVELOPED 1105 ROPE WIRE.



THEN WE MADE ROEBLING'S



1105 takes Royal Blue out of the ordinary wire rope class.

1105 is a rope wire that's new — that's stronger. It's the biggest news in many years.

1105 is the result of more than a century of research and development — it's the wire that gives Roebling Royal Blue the stamina that pays off in service.

Contact your Roebling distributor or write us for the full story.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation



JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5825 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13235 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOUR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 3RD ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N.Y.

SLAB ZINC

every grade of ZINC

for urgent military and
civilian requirements



PAC
MISS



AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

The Iron Age Newsfront

Three In Four (And A Lot Have Two)

GES SING

of Standards believes. Economy stems from low-voltage power supply and use of only two chemicals other than water.

Big Stretch for Aluminum Plate

A 16 million lb two-way pull is available on the new big plate stretcher at Alcoa's Davenport, Iowa, plant. Plate to 12 ft wide, 60 ft long and 6 in. thick will be turned out for high performance military aircraft.

Transistors: Power Amplification Improved

Transistors capable of operating efficiently at frequencies five times higher than transistors produced by normal commercial methods, are reported possible with a new process. Greatly

improved power amplification characteristics at high frequencies are claimed.

Impact: New Study Method Developed

Understanding of impact wave propagation in materials is expected with a recently developed impact tube study technique. With impact tube it is possible to collect fundamental stress-strain data on materials, by applying sudden loads of predetermined force to diaphragms and plates by means of a carefully controlled explosion.

Pinch On Plate Hits Custom Builders

Builders of heavy duty, large custom made machinery who order steel intermittently are severely pinched by the plate shortage. The largest midwest builders is paying premium warehouse prices for almost all plate fabricating. Production type manufacturers which order steel consistently are much better on mill rolling schedules.

How to Get Better Ductile Iron Welds

Physical properties in ductile or nodular iron welds are obtained by carbon arc welding, a recent study shows. This method gives a rapid deposition rate and ease of operation, and is reported to offer an excellent method for salvage of defective castings or repair of broken castings.

Steel Extrusions: Design Flexibility

Present jet aircraft engines use over 300 extruded steel parts. Steel extrusions provide the flexibility needed for fast changing design needs, plus saving time, labor and critical materials.

Earthmoving Equipment and the Openhearth

Several major mills are using a modified piece of earthmoving equipment for cleaning and rebuilding openhearth furnaces. Hydraulically controlled and powered, the modified digger is capable of reducing downtime during a rebuild by 1 to 3 days, one user reports.

SLAB ZINC

every grade of ZINC

for urgent military and
civilian requirements



AMERICAN ZINC SALES COMPANY

Distributors for
AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

The Iron Age Newsfront

Three In Four (And A Lot Have Two)

Private car ownership in the United States has increased to the point where three households in every four own an automobile. And 8 pct of these own and drive more than one car. The present total of two-car families has increased more than three times since 1948.

Stamping It Out In Chicago

Construction of a new stamping plant for the Ford Motor Co. in the Chicago area is expected to start soon. The new plant, part of the company's recently announced \$625 million expansion program, is expected to be completed by mid-1956.

Magnetite: Easier Separation Possible

Magnetite could be separated from ores more economically with a wet magnetic ore separator, some metals researchers believe. A moving, permeable, filter type membrane would be used to minimize entrapment of non-magnetic particles during wet separation.

Magnesium: Better Coatings at Lower Cost

Protective coatings for magnesium can be obtained more economically using a low voltage alkaline chromate process, the National Bureau of Standards believes. Economy stems from low-voltage power supply and use of only two chemicals other than water.

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**FORGED TO GIVE CARS
STRONG BODIES**



• YOU CAN'T JUDGE A ROLL'S STRENGTH BY ITS FINISH.

In the Midvale roll above, both finish and strength are important . . . a hard surface for wear, a smooth surface to give a fine finish on auto body steel, and toughness for durability in cold rolling service. Midvale forges rolls that have both. A half-century of steel-making experience goes into every roll . . . experience in casting ingots, in forging to develop its strength, in heat treating to give it desired properties where needed, and in machining to give it the surface finish.

Of major importance are the tests given the forging at different stages . . . tests to check on composition, structure, hardness, strength and dimensional accuracy.

The same is true of every Midvale product . . . rolls for steel or paper mills . . . forging and alloy castings for heavy machinery, reduction gears, hydraulic presses, turbine machinery, press cylinders and high pressure vessels.

You name the purpose . . . we'll supply the roll . . . of hardened and ground alloy or stainless steel.

THE MIDVALE COMPANY-Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh,
Washington, Cleveland, San Francisco

MIDVALE



FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS



What Steel Price Hike Means To You

Price increases by steel companies boosted Iron Age Finished Steel Composite \$7.62 per ton . . . Unlike last year, steel firms passed on full cost of wage hike to consumers—By J. B. Delaney.

• STEEL PRICE INCREASES resulting from the 15¢-an-hour wage boost will eventually increase operating costs of all industry.

Directly affected by the increase, which boosted THE IRON AGE Finished Steel Composite Price by \$7.62 per ton, will be the automotive, appliance, machine tool, equipment, and other industries that manufacture products composed largely of steel and iron.

Buyers of these steel-fabricated products, including the steel companies themselves, will be hit later

as the inflationary spiral mushrooms throughout the economy.

In setting their new prices, the steel companies considered not only the direct cost of the wage increase but also the boomeranging effect it will have on cost of the things they buy. They are faced, too, with the task of financing a new round of expansion. They'll need greater earnings which in turn will attract much-needed equity financing.

Unlike last year when they absorbed approximately one-fourth of

the wage boost cost, the steel companies this year apparently passed the entire cost along to consumers. Tough competition in 1954 forced the industry to adopt a more moderate approach to the price question.

At that time, Clifford F. Hood, president of U. S. Steel Corp., admitted that "competitive conditions . . . require . . . a lower price adjustment than would otherwise be justified by all considerations."

This year there was no such compulsion. Business is good and

Steel Prices Keep Rising

Dollars per Net Ton



Prices are yearly average
based on Iron Age Finished Steel Composite

*Based on Iron Age Finished Steel Composite as of July 12, 1955

will continue so throughout the year. The outlook for 1956 also is encouraging.

Pig iron producers later raised prices \$2.50 per ton across the board.

Expect Coal Wage Hike

By conservative estimate, cost of the wage increase to steel companies eventually will total \$450 million. This includes direct wage and salary costs and the impact on cost of goods and services to the industry.

Some individual company estimates on the eventual cost to the industry ran to more than \$700 million. And some doubts were expressed that the price hike will prove to be enough to compensate the industry. The experience of individual companies indicates that overall costs might rise as much as 1½ times the direct employee costs.

The steel producers also took into account an expected demand by John L. Lewis, president of the United Mine Workers, for a wage boost for his members. This will affect coal mining costs in the captive mines of steel companies.

Nature of some of the price increases eased the pressure on non-integrated mills that buy hot-rolled products from the major producers. These non-integrated companies are annually up against the problem of paying more for hot-rolled items and at the same time increasing wages of their employees the same amount as the big mills. The large producers also set prices for the same finished products sold by the non-integrated mills.

Line Up Price With Cost

This year, the spread between the price of hot-rolled bars and cold-finished bars was increased from \$22 per ton to \$25 per ton. On cold-rolled carbon strip versus hot-rolled strip, the spread was widened to \$42.50 per ton from last year's \$34 per ton. The differential between hot-rolled and cold-rolled sheet was increased from \$18 per ton to \$20 per ton.

Increases in the differentials also

reflect the continuing program of steel companies to bring selling prices into line with actual cost of production. As the amount of work necessary to produce a given product increases, wage and power costs as well as wear and tear on equipment must be taken into consideration.

The 5.8 pct increase in stainless steel base and extra prices doesn't sound like too much of a price boost, but in terms of the cost in dollars per ton to consumer it is considerable. For instance, the increase on base price of stainless Type 301 sheets represents an advance of \$50 per ton. Type 301 cold-rolled strip went up \$45 per ton.

Plow Back Profits

In announcing U. S. Steel's price boosts, which became effective at 12:01 a.m., July 6, Mr. Hood pointed to his company's record in holding increases to a minimum in the face of strong inflationary forces. He attributed part of this record to constant improvement of operating practice and modernization of facilities.

"Nearly 40 pct of all the profits U. S. Steel has earned during this period (the last 15 years) has been plowed back into this modernization program, which has cost, to date, approximately \$3 billion, and this plowing back must continue unabated if the country's defense and civilian needs for steel are to be met in the days to come," Mr. Hood said.

One-Fifth of a Hamburger

The U. S. Steel president pointed out that many people over-emphasize the effect of a steel price increase on the cost of living. He estimated that under the new price schedules the cost of steel going into a 6-room house would be increased by only about \$19; cost of a \$2500-\$3000 automobile only about \$15; cost of a \$300 refrigerator only 90 cents, and the cost of a \$25 electric toaster, 4¢.

Mr. Hood estimated the average price of carbon steel under the new schedule at about 6½¢ per lb. "That," he said, "is only about one-third the cost of a pound of bread; two-thirds the cost of a pound of milk, and one-fifth the cost of a pound of hamburger steak."

Behind The Steel Price Increase

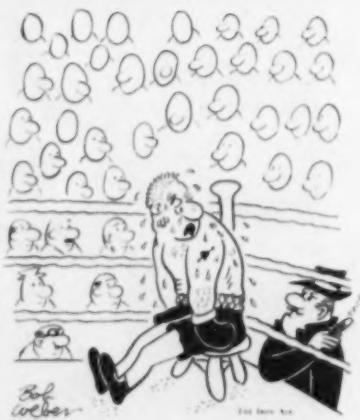
* The steel industry feels it must make a good earnings record to help finance a necessary new round of capacity expansion and to attract new equity capital for the same purpose.

* Just around the corner is another demand for higher wages from John L. Lewis, president of the United Mine Workers. Higher pay for miners will increase cost of coal produced in steel company captive mines.

* Steel wage and salary increases growing out of negotiations between major producers and the United Steel Workers were the direct cause of the steel product price boosts.

* In setting the new prices, steel companies also had to consider the resultant inflationary spiral which will increase their costs of goods and services.

* Unlike last year, when business was slow and competition keen, the steel producers apparently passed along the entire cost of the wage boost to their customers.



"I've changed my mind, I'll take you up on that offer to throw the fight after all."

	New Price	Old Price	Increase
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CARBON STEEL:

Ingots, forging	\$ 65.00		
Blooms, billets, slabs—forging	84.50	\$ 78.00	\$ 6.50
Blooms, billets, slabs—rerolling	68.50	64.00	4.50
Sheep	84.50	78.00	6.50
Tube rounds	103.50	96.50	7.00
HR bars, small shapes	93.00	86.00	7.00
Fairless Works	96.00		
Cold-finished bars	118.00	108.00	10.00
Concrete rein. bars	93.00	86.00	7.00
Fairless Works	96.00		
Structural shapes	92.00	85.00	7.00
CB's (including CBL, CJB and CB sections)	92.00	85.00	7.00
Bearing piles (CBP sections)	92.00	85.00	7.00
Sheet piling	109.00	101.50	7.50
Plates	90.00	84.50	5.50
Standard T rails			
No. 1 O.H.	94.50	89.00	5.50
Light rails	113.00	107.00	6.00
Tie plates	112.50	105.50	7.00
Floor plates	111.50	105.50	6.00
Joint bars for standard rails	116.50	106.50	8.00
Track spikes	158.00	146.00	12.00
Axles	145.00	135.00	10.00
Hot-rolled strip	86.50	81.00	5.50
HR-Sheets (18 ga. and heavier)	86.50	81.00	5.50
Fairless Works	87.50	82.00	
Cold-rolled sheets	106.50	99.00	7.50
Fairless Works	107.50	100.00	
Galvanized sheets, regular	117.00	109.00	8.00

HIGH STRENGTH PRODUCTS:

USS COR-TEN			
Structural shapes	135.00	128.00	7.00
CB sections	135.00	128.00	7.00
Plates	134.50	129.00	5.50
HR bars, small shapes	136.00	129.00	7.00
Hot-rolled sheets	127.50	122.00	5.50
Fairless Works	128.50	123.00	
Galvanized sheets	172.00	164.00	8.00
Cold-rolled sheets	157.50	150.00	7.50
Fairless Works	158.50	151.00	
Hot-rolled strip	128.50	123.00	5.50

USS MAN-TEN

Structural shapes	112.00	105.00	7.00
CB sections	112.00	105.00	7.00
Plates	111.00	105.50	5.50
HR bars, small shapes	109.00	102.00	7.00
Hot-rolled sheets	103.50	98.00	5.50
Fairless Works	104.50		

USS ABRASION RESISTING

Plates	113.00	107.50	5.50
HR bars, small shapes	116.00	109.00	7.00
Hot-rolled sheets	109.50	104.00	5.50
Hot-rolled strip	109.50	104.00	5.50

WIRE PRODUCTS

Wire rods carbon			
Donora, Cleveland			
Joliet and Fairfield	100.50	93.50	7.00
Worcester	106.50	99.50	7.00

Ingot (net ton)	69.00	65.00	4.00

Checklist of Steel Price Increases

Following are new mill prices of U. S. Steel, effective July 3. Prices are in dollars per net ton unless otherwise noted. Extras apply. Former prices are listed for comparison.

Cold-rolled low carbon strip

Cleveland	\$129.00	\$115.00	\$14.00
New Haven	144.00	130.00	14.00
Worcester	146.00	132.00	14.00
Premier spring wire			
high carbon			
Cleveland, Donora, Duluth and Rankin, Waukegan and Fairfield	125.00	115.00	10.00
Worcester	131.00	121.00	10.00

New Haven, Trenton and Worcester	152.00	144.00	14.00
MB spring wire—high carbon			
Cleveland, Donora, Duluth and Waukegan	158.00	144.00	14.00
Trenton and Worcester	164.00	150.00	14.00
Nails			
Donora, Duluth, Joliet, Rankin and			
Fairfield	152.00	137.00	
Worcester	158.00	143.00	
Polished staples			
Donora, Duluth, Joliet, Rankin and			
Fairfield	152.00	138.00	
Worcester	158.00	144.00	

PIPE AND TUBULAR PRODUCTS

Buttweld standard pipe			
1/2" - 3" T & C			
1/2" - 3" P. E.			
3 1/2" - 4" T & C			
3 1/2" - 4" P. E.			
Seamless standard pipe			
2" - 4" T & C			
2" - 4" P. E.			
Seamless line pipe			
5" - 10" T & C			
5" - 10" P. E.			

Seamless and electric weld line pipe

12" - 22" P. E.			
24" - 36" P. E.			

For details on markets and prices see market section starting on P. 155 and steel price pages starting on P. 165.

Get Set to Boost Malayan Tin, Rubber

World Bank will loan several million dollars to support Malaya's shaky tin and rubber industries . . . See tin market dropping off as trend to electrolytic tinning spreads . . . Stress is on rehabilitation.

• THE WORLD BANK is getting ready to prop up the shaky tin and rubber industries in the Malay peninsula with loans totaling at least several hundred million U. S. dollars. A new United Nations staff report says \$500 million would be about right for a start.

Washington lending officials are pointing out that Malay is the world's largest producer of tin, and the second largest (Indonesia is first) producer of natural rubber.

Thus, Malaya stands high as a rich military prize. Moscow, as well as London and Washington, is eager to pay a high price for Malaya's stores of these two strategic commodities.

See Less Tin Demand

Tin accounts for about 25¢ out of every export dollar received by Malay concerns. But the current needs are for rehabilitation, not for expansion. The mission says flatly that the future tin market is "uncertain," and it suggests that

Malayan operators will have to scramble to maintain their present customers around the world.

Clearly, the world-wide adoption of electrolytic tinning will lead to further cuts in tin consumption. British sources say U. S. can companies have embarked on a long-range program leading toward the eventual elimination of tin in the container industry—an objective already accomplished in the oil container field.

But offsetting these declines to some extent are these strong market notes:

- Broader use may be found for thinly-coated plates.
- Use of tin cans for carbonated beverages—and more recently for domestic wines—is gaining in consumer favor.
- Expanding economy and increasing population.

The past 12 months have seen increases in demand for tin. Washington points out this is due to as-

surances of continued supplies at fairly stable prices, plus the worldwide high level of industrial activity.

The UN mission predicts that even if the U. S. should stop its buying, the proposed International Tin Agreement would stabilize production at somewhere near actual consumption. The tin agreement would provide for a buffer stock of 25,000 tons. But it is suggested that high-cost producers might have difficulty in competing with Malayan mines.

The mission says there are vast possibilities for developing the unknown mineral wealth of the Malay peninsula. And it suggests that part of the forthcoming loan be earmarked for geological surveys to learn how the peninsula's mineral wealth can be further developed.

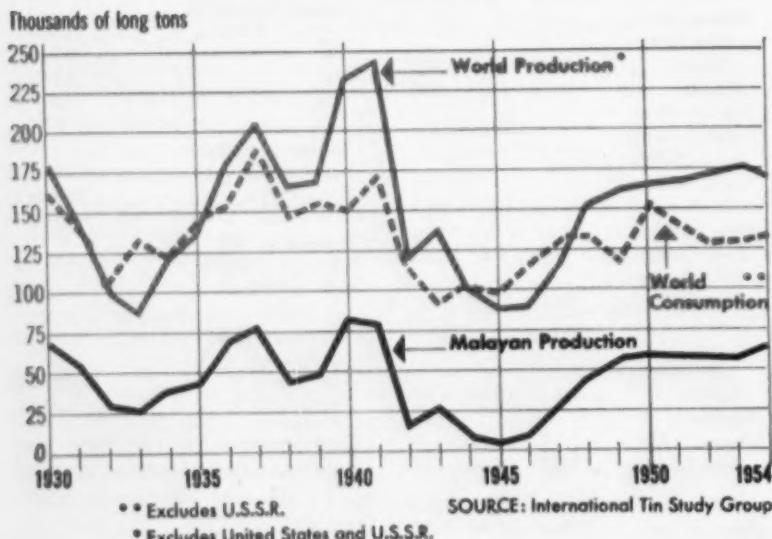
The rubber industry badly needs rehabilitation, the mission observes. It says many areas should be completely replanted with high-yielding trees which would put natural rubber in a better competitive position in relation to synthetic rubber.

Keep Them On Our Side

Aside from these two principal areas—tin and rubber—the UN officials suggest that the loan also be used to build more farm-to-market roads; to expand and improve Singapore, Port Swettenham and Penang; to buy diesel locomotives, rolling stock, and maintenance equipment; to expand greatly the power-generating capacity of the Peninsula, for installation of water systems and sewer systems, and for better residential housing.

All this adds up to a major project, and one the World Bank believes will successfully keep the rich and militarily important Peninsula on the side of freedom.

World Production, Consumption of Tin



Ford Likes Chicago

Announcing proximity to a major steel producing center as a major consideration, Ford Motor Company last week announced plans for a \$25 million, 1.5 million-sq ft stamping plant to be erected at East Chicago.

The stamping plant in the Chicago area brings the total Ford operations there to four. The aircraft engine plant is one of the nation's largest jet engine producing facilities. Ford also has an assembly plant at Chicago and a major parts depot.

Good Location

The East Chicago location puts Ford within short haul distance of the Gary, Indiana Harbor, South Chicago steel mills, among them U. S. Steel's Gary works, rated as the world's largest steel plant, and the South Works of U. S. Steel, rated as number three mill in total size.

Convenience to steel supply had previously been a factor in the erection of General Motors Willow Springs plant, a stamping operation that is still expanding; as well as the Budd Company operation at Gary.

Set Steel Marking

Copies of a new military standard for marking selected iron and steel products are to be ready for distribution by the government about Aug. 1.

Military Standard 183, developed for the Defense Dept. through joint industry-government efforts, prescribes uniform physical markings to be performed by producing mills. Symbols will denote the manufacturer's name or trademark, the composition and condition designators now in use by industry.

Provides Better Identity

This marking system is expected to reduce the chances of mixing steels, provide better identification of products transferred from one armed service to another, and permit reallocation of existing stocks and supplies. Also anticipated is the conservation of materials, time, and manpower.

MANUFACTURING

SHAPES: Rolling Cuts Costs

New shapes are continually being adapted to rolling techniques . . . From 15 to 20 pct of all carbon steel bars are rolled for eventual use . . . Savings are high.



MICROMETER SHOWS engineers how closely stainless jet engine ring section approximates finished section. Rolling greatly reduces machining time.

◆ THE 50-YEAR-OLD art of rolling special shapes has been refined to a science by engineers and mill roll designers. Today, everything from jet aircraft engine rings to plowshares are being rolled to close tolerances, greatly reducing machining time.

Industry sources estimate that in recent years approximately 15 to 20 pct of all carbon steel bars produced are subsequently rolled into special shapes. New shapes are continually being adapted to rolling mill production when tonnages are sufficient to compensate for high roll costs.

Big Savings

In many cases, rolled shapes are replacing castings, forgings, and formed products. Substantial savings in material and labor are possible. Material savings are especially important where the part contains critical alloys. Jet air-

craft engine rings, for instance, are made of a high temperature alloy heavy in nickel and chrome content.

Since the jet aircraft program got under way in 1950 as many as a dozen shapes have been rolled for use in jet engines. However, due to the continual change of design, production quantities are limited. Today, with extrusion processes gaining prominence the majority of shapes are extruded. Die costs for making extrusions are only a fraction of roll costs for special shapes.

United States Steel Corp. is supplying a fabricator with two of the largest stainless steel sections ever rolled for jet engines. Previously, these ring frame sections were ordered in rectangular shapes, then forged or machined to shape. Besides the savings in time and labor, considerable material savings were achieved in vital alloys.

IRON ORE: Shipping Crisis Looms

Growing imports result in shortage of seagoing carriers . . . New ships are being built in foreign shipyards . . . Shortage of carriers hurts import business . . . Lakes shipments are up—By T. M. Rohan.

♦ A SHORTAGE of seagoing ore carriers threatens to cramp shipments of iron ore from fast developing mines in Labrador and South America.

Steel and ore companies are attempting to alleviate the scarcity of bottoms by placing orders for new units, all to be constructed in foreign shipyards where construction costs are a half or a third of those in the U. S.

It's predicted that imports of foreign ore by Eastern mills will reach 20 to 25 million tons this year, a figure that will increase rapidly as the new mines begin to take stature in U. S. and world steel production.

"Last year we could get all the foreign bottoms we needed to import and export ore along the At-

lantic seaboard," a shipping expert told IRON AGE last week. "This year they're having a field day carrying coal to Europe at higher rates than we can afford for ore and we're losing business on account of it."

In the fourth quarter of 1954 and so far this year there has been a major upsurge of seagoing iron ore carrier ordering and building in foreign yards. Bids are currently being solicited in Europe and Japan for more ships that will carry oil or ore.

Heavy ore shipments are being made from Republic Steel's Liberian ore fields in new bulk carriers of the States Marine Corp. to Baltimore for transshipment to Republic mills. National Bulk Carriers is moving most of U. S.

Steel's ore from Venezuela to the Fairless Works and to Mobile, Ala., for Tennessee Coal & Iron Div. Bethlehem is using ships in its own fleet for moving Venezuelan ore.

Up the St. Lawrence

Iron Ore Co. of Canada's Labrador ore is moved up the St. Lawrence seaway in new vessels of the American-Hawaiian Steamship Co. and transshipped from Montreal in smaller "lakers."

Last month the first of two 31,000 ton capacity oceangoing ore carriers being built in Britain for Iron Ore Transport Co. was launched. The *Sept Isles* will carry Labrador ore for participating steel companies, Armco, Hanna Coal and Ore, National Steel, Wheeling Steel and Youngstown Sheet & Tube.

One of the major eastern factors this year is Fairless Works at Morrisville, Pa., which expected to take about 5 million tons from the corporation's Cerro Bolivar field in Venezuela. About one shipload of 7000 tons per day is coming in and must be held to this figure because of shallow 25 ft. depths in the still undeeepened dredged Delaware river. Total Venezuelan shipments to the U. S. this year are 225 pct over 1954.

To meet the ship shortage developing from foreign ore operations, 27 large bulk ore and bauxite carriers have been ordered abroad since late 1953 totalling 615,450 tons. Of all vessels ordered abroad, England and Scotland are building 30 pct, with Japan and Germany a close second and third. Low foreign building costs, of course, are bringing in the business. Some tankers have been built in Japan for as low as \$105 per deadweight ton compared to two or three times

Here's the Ore Picture:

LAKE ORE SHIPMENTS gross tons

first 6 months '55	26,933,081
first 6 months '54	21,585,519

LAKE ORE ON HAND gross tons

as of June 1, 1955	21,041,368
as of June 1, 1954	28,436,221



this price in the U. S. Most oceanic vessels are also registered abroad to escape high U. S. operating costs.

Three of the largest cargo vessels in the world were recently completed in Japan for National Bulk Carriers for Liberian registry. Each measures 794 ft. in length with a 116 ft. beam.

Latest big ore boat launching on the Great Lakes was the *Geo. M. Humphreys* last year at Lorain, Ohio. It carries over 22,000 tons of ore at well over design speed of 16.5 mph. On its maiden trip it broke existing records. This vessel is owned by National Steel and operated by M. A. Hanna Co. which also operates the *Ernest T. Weir* and *Joseph H. Thompson*, largest carriers in the American fleet. All are expected to go into Labrador service on completion of the St. Lawrence seaway project.

Home Shipments Up

In the Lake Superior district ore is being moved at near record levels but little hope is entertained tonnage will surpass the 1953 record of 95.8 million tons. In the week ended June 20 this year over 3 million tons were loaded at upper lakes ports for the first time since September 1953.

On June 1 the fleet was 7 million tons behind the 1953 record or slightly over two weeks. About 245 of the fleet of 265 boats are in service and additional ones are currently being taken out of mothballs. U. S. and Canadian ore stockpiles as of June 1 were 21.9 million tons. Despite the record shipments, ore consumption by blast furnaces has been almost at capacity all year. Although shipments were high Great Lakes ore stockpiles as of June 1 were 21.9 million tons compared to 29.5 million a year ago. Consumption in May was 7.7 million tons, highest month on record since October, 1953, when it hit 8.1 million. U. S. and Canadian consumption through May was 35.6 million tons compared to 29.3 last year.

Blast furnaces in service in the U. S. and Canada currently number 186 of a total of 204. Those idle have dropped from 76 in '54 to 18 today as the nation's mills increased use of hot pig iron.

TITANIUM: A New Use Program

Air Force increases research appropriation, plans utilization program . . . Red planes show need for better alloys and more coordinated effort.

◆ FINALLY ARRIVING: a concerted government program to push titanium utilization.

Already spending \$3 millions annually on titanium research, the Air Force recently switched at least an additional \$1.5 million from other commitments to titanium research. Along with this, development contracts are being let that have been in the negotiation process for months.

There's a lot of evidence that the sudden titanium push is directly attributable to recent displays of Russian aircraft that apparently set wheels turning in Washington. Until recently, there had been much talk, little action.

Increase use

Air Force buys about 98 pct of the total titanium consumed, other than amounts stockpiled for emergency use. Air Force is currently using about 150 tons per month, and will purchase an additional 100 tons over the next six months earmarked for developmental and research work. The total will bring Air Force use of the metal to a little over 1800 tons of metal this year, as compared with 10,000 tons produced this year; 17,500 tons scheduled for production next year; and 22,500 tons in 1957. At this stage, then, the actual buying is a drop in the bucket of potential titanium output.

Air Force's indicated goals: a stepped up emphasis on titanium alloy research, particularly in sheet, that will have set the stage for increased aircraft utilization of titanium within six to eight months. Again, the emphasis is on sheet, but forgings and castings as well as extruded members

should share in the advance. In about 60 days, another phase of the research program will be inaugurated, aiming specifically at production of titanium alloys for sheet rolling that will meet the advancing strength requirements of aircraft builders.

The attack is three pronged: (1) To improve existing alloys or to develop new ones with higher strength at higher operating temperatures, particularly as sheet; (2) to encourage aircraft builders to work with titanium, train their design and fabricating departments in the use of the metal; (3) pull together the various research labs already working on titanium to effectively pool their findings.

Match Reds

How much is due to the Red Air Force's showing strategic bombers and new fighters over Moscow in production quantities 60 days ago? Air Force denies the program was whipped up then. It's true that the groundwork for the present program was instituted in 1954, and that one research lab aimed specifically at producing higher spec aircraft titanium was already working in March. But anyone in the titanium using industry will agree that when Russia put her aircraft cards on the table over Moscow in May, our own research and development program began to develop considerable thrust of its own.

Post May-Day activity is reflected at the aircraft production level as well. Orders to push production of the F-101, a fighter built to defend our long range bombers enroute to a distant target, were announced in June.

CTC: Means One Track Instead of Two

Centralized traffic control, a highly efficient electric and electronic train control system, makes it possible to carry almost as much traffic on one track as on two . . . New York Central pushes CTC.

♦ THEY'RE RIPPING up the tracks between Buffalo and Cleveland. The present four-track line between these points will be cut to two, and to do this, it's going to cost New York Central RR around \$6 million.

It sounds as though NYC is retrenching. It isn't. The move is a carefully thought out modernization step that will bring Centralized Traffic Control (CTC), a highly efficient electric and electronic train signal and control system, to the 163-mile stretch between Buffalo and Cleveland.

Installing CTC on the Buffalo-Erie run is expensive, but NYC figures the savings from the new control system will pay off the \$6 million investment in 6 years. Direct savings over the old control and signal method are figured at \$3000 per mile, per year, per track. Cost cuts come from reduced main-

tenance charges, smaller payrolls and savings on right-of-way taxes.

There's nothing new about CTC. First major installations were made in the late Twenties and conversion to this system has grown fairly steadily ever since. Trend received a considerable push shortly after World War II, when the railroads were trying to expand their capacity but found it difficult to obtain rails. CTC was a natural alternative, since it is estimated that a single CTC track has a capacity roughly 80 per cent that of a standard double-track line.

Basically what CTC does is to bring about a marked improvement in train handling efficiency. This is the main reason it is possible to use one track (in addition to sidings and switchovers) to carry traffic running in both directions simultaneously as well as trains going in the same direction.

One man sitting at a central control panel can tell from flashing lights where every train is, and can pull the switches necessary to put one train on a siding or switch-over. The man at the control board also manipulates the signals along the tracks which tell the train engineer when he is about to be switched off and what speed he should be traveling at.

Won't Cut Steel Needs

In addition to reducing the number of tracks necessary, CTC also eliminates the many signal towers that are needed at critical traffic points along a conventional track. Only limitation on the length of track that can be controlled by one central control station is the amount of traffic on the route and the complexity of the operation.

Since CTC makes it possible to reduce the number of tracks needed between two points, it might seem that installation of this system would mean a sharp cut in the railroads' demand for steel rails. But it doesn't work out that way. Since most of the lines on which CTC is installed carry about twice as much traffic as before, the rails have to be replaced almost twice as often.

Costly to Install

In some cases, when CTC is put into effect heavier rails are used. What it all boils down to is that CTC doesn't have much effect on rail demand.

Main drawback to CTC is that it is comparatively expensive to put into effect, though the savings over the long run make it extremely economical. According to latest available statistics there are around 22,141 miles of CTC controlled track in the U. S. A lot more is on the way.



FLICKS AND FLASHES at CTC board, Mattoon, Ill., keep dispatcher up to the minute in overseeing railroad signals and controls.



WELDING: A New Art Form

Welding torches have invaded artist's studio replacing old hammer of the sculptor . . . New art form gains approval as contemporary in tool and theme.



CONTEMPORARY artists weld steel into sculpture in welded art studio in New York City.

♦ WELDING torches have replaced the sculptor's hammer and chisel in welded sculpture, a new medium that is gaining recognition in artistic circles.

Approval of this form of sculpture in the world of art is evidence that artists look to industry not only for inspiration but also for new tools that can be used in their trade.

Among sculptors working in this new field, overalls, goggles and gloves have become identifying features in place of the traditional paint or clay daubed artist's smock. Their studios are equipped with power lines, abrasive wheels and acetylene torches of the factory instead of easels, brushes and canvas.

The welder-sculptor works from

models, usually starting with a clay or wire "sketch" which he enlarges to final size with steel strips and welding torch. Welded sculpture usually has a rough and pitted exterior adaptable to modern themes, but can also take on a smooth finish by brazing and buffing. Welding artists are pushing toward a form that is contemporary in both tools and theme.



LIKE more conventional sculpture, welding artist also starts with a wire model of his final work.



ROUGH spots of welded steel horse are ground off by Sculpture Center Director Sahl Swartz.



BASKETBALL players is the theme of this work done with steel as material and welding torch as tool.

SILICON: New Uses Opening Up

Scientists are finding new, expanding markets for the non-metallic element . . . Latest application is in power rectifiers . . . Lower costs, plentiful supply mean wider uses—By D. G. Picinich.

• SILICON—the nonmetallic element long familiar to research metallurgists and the metalworking industry—is in the news again.

Current word from Bell Laboratories tells of a new silicon power rectifier which shows promise of reducing costs greatly in many industries using electric power. The device converts alternating current to direct current—an essential step in telephone system operation, running the machinery of industry, or powering home TV sets.

Bell foresees an almost unlimited life span for the new unit, believes it capable of operating continuously at temperatures up to 400°F—nearly double the limit at which germanium, another semiconductor material, begins to lose its important transistor qualities.

Two of the new rectifiers, when made about the size of peas, linked together, and mounted on a cooling

fin, will furnish more than 20 amp of direct current at 100 v. This amounts to 2000 w with only 20 w lost through heat. One amp or less is needed to run a radio or TV set or to operate a group of telephone switching relays.

These advantages over earlier larger and more bulky power rectifiers are expected to open up many new uses in telecommunication, heavy industry and in military applications.

Purity Key Factor

GE scientists in Schenectady, N. Y., have produced sizable superpure "lifetime" crystals from a special supply of top-grade elemental silicon with purity measured in parts per million—not available in more than laboratory quantities until recently.

As contained in common sand, silicon is one of the most abundant elements in the earth's crust. In a

highly pure state, however, it's a rare and invaluable semiconductor of electricity.

Using Bell Labs' "zone-melting" refining process, research centers such as GE and Bell itself have been able to refine silicon to near 100 pct purity. Scientists are aiming for as near perfection as possible to find out fully silicon's physical, chemical, and electrical properties.

Commercially, Du Pont, Dow Corning and Electromet have found a ready market for silicon in pigments application, for use in high and low temperature electrical insulators, as ferrosilicon, and in briquette form in foundries. The commercial grade runs about 97 pct silicon and less than 1 pct iron. It's also used for adding silicon to aluminum alloys and for fluxing copper alloys. Both Dow and Electromet have their own refining facilities.

Prices Vary Widely

Du Pont pioneered development of pure silicon in 1940. Current price tag on their specialty-grade 99.99 pct pure is \$380 a lb. That's \$50 less than it sold for two years ago. As volume increases, Du Pont expects to be able to reduce prices still further. High initial cost becomes less a factor to scientists when it's kept in mind that the silicon in a tiny wafer used by a transistor, for example, costs 2 to 4 cents.

In intermediate grades, silicon 99.8 pct pure sells for \$16 to \$20 a lb. Commercial grades 96-98 pct pure sell for around 17¢ a lb.

Today's research plus current commercial applications for silicon foreshadow such upcoming markets as: lower-cost TV sets; tiny radios now seen only in comic strips.



ZONE-MELTING process at General Electric consists of successive recrystallizations of silicon as an ingot is drawn through gas-filled quartz tube.

Pass Stopgap Measures

Congress, caught with its deadlines down, is passing emergency 30-day extensions of three acts in order to keep government programs going while they argue about the details of longer programs.

Extended DPA

The lawmakers extended the Defense Production Act for 30 days to keep the government's allocation powers and purchasing programs running after the June 30 expiration date of the old measure. Up for consideration in the next month is a bill reported by the Senate Banking Committee which would extend the DPA for 2 years, but would restrict use of dollar-a-year industry advisors to government, and would limit antitrust immunity for defense contractors.

Also extended for 30 days are the laws setting up the Small Business Administration and its lending programs, and four federal housing programs.

ODM Grants Tax Aid

Certificates of necessity for fast tax amortization of 53 new or expanded facilities costing a total of \$64.8 million are granted by the Office of Defense Mobilization in the 2 weeks ending June 15.

Biggest Awards

Three largest certificates go to Monsanto Chemical Co., Texas City, 45 pct of \$8,275,000 for methanol allowed tax benefits; The Texas Co., New York, 60 pct of \$6,865,000 for an ocean-going tanker; and Chicago & North Western Railway Co., Chicago, 55 pct of \$4,236,550 allowed for diesel locomotives.

AEC Offers Data

An additional score of government-owned patents held by the Atomic Energy Commission are now available to industry for non-exclusive, royalty-free licensing as part of the AEC program of making nonsecret technological information available for use by industry.

DEFENSE



FLOATING BRIDGE component for the Army is unloaded from truck by hydraulic boom developed by the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Va. Hydraulic power is furnished by the truck's engine.

Descriptions and abstracts of the patents are available from the Atomic Energy Commission Patent Branch, Washington 25, D. C. The 20 patents just released bring to 767 the total number available for industry licensing from AEC.

GE Gets \$6 Million

A \$6 million-plus contract for remote controlled, radar-directed armament systems for Boeing B-47 Stratojet bombers has been awarded to General Electric by the Air Force.

The new contract is a follow-up of a \$22 million contract for B-47 armament systems which was signed by the GE and the Air Force in 1953. Production work will be done at Johnson City, N. Y., and Burlington, Vt.

Contracts Reported

Including description, quantity, dollar values, contractor and address. Italics indicate small business representative.

Radar parts, \$1,775,725, Motorola, Inc., Chicago.

Components of AN/APN-70, \$1,020,892, Radio Corp. of America, Los Angeles.

Airplanes and special tools, 28, \$1,227,792, Canadian Commercial Corp., Washington, D. C.

Steel, illuminating 155 MM, 61000, \$2,801,850, Pace Corp., Baseline, Mich.

Constant speed drives, \$2,000,000, Sundstrand Machine Tool Co., Rockford, Ill.

Tire control systems, 61, \$5,409,065, AVCO Mfg. Corp., Cincinnati, Arthur J. Veraz.

Helicopters, 98, \$10,550,000, Piasecki Helicopter Corp., Morton, Pa.

Tanks PR #PA-180927, \$2,498,182, Republic Aviation Corp., Farmingdale, N. Y. Shell, 6260, \$1,845,025, The Midvale Co., Philadelphia, Pa.



"It's a new light weight metal they want us to try—that's all I know."

EXPANSION IN INDUSTRY

Machine Tools:

Snyder ups plant work area 50 pct for new machinery.

Snyder Tool & Engineering Co., Detroit, has completed plans for a \$500,000 plant development program.

Work has begun on increasing floor space by 50 pct for production of automation machines and special machine tools. The job is slated for completion by early fall of this year.

Increased demand by the metal-working industry for new types of automation machinery has prompted the current move.

Triple Assembly Area

Recent transfer-type tool units delivered by the company to the automotive industry have measured up to 180 ft in length costing in excess of \$1 million.

New facilities will be geared to turning out similar machines measuring up to 250 ft long, 25 ft in height.

The plant's newly enlarged installations will provide triple the former assembly area. More than 250 hp will be available in the new area for machine testing. Crane facilities of 25 tons will be provided.

Modernization:

Canadian fabricator spends \$2 million in program.

Page-Hersey Tubes, Ltd., Toronto, will shortly complete a \$2 million modernization program of its Welland, Ont., seamless pipe mill.

Half of the current expenditure has gone into a second cold-expanding machine. Additional plans are also underway for a multi-million dollar program to boost the company's output of electric weld pipe.

The current step is the latest in a continuing program in operation since the plant was erected in 1930.

When the new facilities are completed, seamless tubular products will range from $\frac{1}{2}$ -in. pipe size up to and including 7-in. OD.

Added installations will allow for output of oil country goods in addition to present production facilities for electric-resistance welded casing.

Plan Atomic Building

Architect-engineer services leading toward construction of the new \$10 million atomic energy building in Washington are to be performed by Voorhees, Walker, Smith and Smith, of New York City.

The Atomic Energy Commission asked 51 firms to submit proposals for the work. Final selection was made from among 9 firms considered "best qualified."

Enter Canada Market

Plans have been completed by Mueller Brass Co., Port Huron, Mich., for construction this month of plant facilities at Strathroy, Ont.

Approximately \$300,000 will be expended on the new Canadian site which will turn out aluminum windows for commercial, institutional and residential markets.

The company's wholly-owned

subsidiary, Valley Metal Products Co., Plainwell, Mich., produces, in addition to aluminum windows, extruded aluminum shapes for other fabricators.

Among major products produced by Mueller are copper tube, valves, solder-type fittings, and fittings and accessories for the refrigeration and air conditioning industries.

Finance \$20 Million

Thompson Products, Inc., Cleveland, has entered into a \$20 million financing arrangement with its West Coast affiliate Ramo-Wooldridge Corp. of Los Angeles, Calif.

Through preferred stock and long-term revolving credit, up to the \$20 million limit is being made available by Thompson to finance the continued development of the electronics and guided missile producer.

Terms of the new agreement provide Thompson with option rights which in the future could increase its interest in Ramo-Wooldridge to 84 pct.

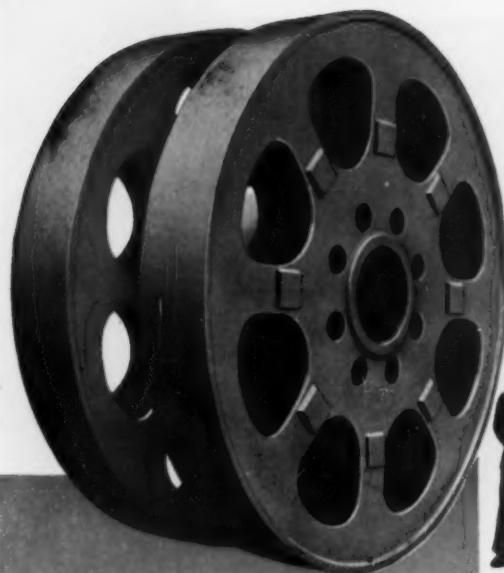
Current facilities of the western affiliate include 150,000 sq ft of laboratory space in Los Angeles with two new buildings under construction. Product output includes electronic computers, guided missiles, transistors, and weapon control systems.

Fabricated Structural Steel

Contracts, Shipments, Backlog for May, 1955

CONTRACTS CLOSED	Estimated Net Tons		
	1955	1954	Avg. 1947-50
May	304,498	199,383	176,266
Year to Date	1,335,416	1,022,228	889,640
SHIPMENTS			
May	223,184	253,886	198,426
Year to Date	1,132,523	1,331,531	910,664
BACKLOG	1,592,384	1,489,662	

Source: AISI



**Twin Turbine Gear Wheel
for Westinghouse Elec-
tric Corporation**

Of heavy steel throughout
with a hollow bored steel
hub made in our own forge
plant.

**Column Bearing Plates
for Loewy - Hydropress,
Incorporated, N.Y.C.**

Welded of 3" and 5" thick
plate for a 50,000 ton Hy-
draulic Die Forging Press
designed and built for the
USAF Heavy Press Program
to be operated by Wyman-
Gordon Company, Worcester, Mass.

When you need

**LARGE—HEAVY
and ACCURATE**

Weldments

call on

STRUTHERS WELLS

The Gear Wheel and Bearing Plates illus-
trated typify Struthers Wells' manufac-
turing versatility.

The extensive facilities of three modern
plants plus a century of experience are
at your service.

We welcome the opportunity of furnish-
ing either the complete assembly or
any weldment part that is beyond your
capacity.

Write for Weldments bulletin.

10'3"

Four of these
8900 lb. bear-
ing plates
were supplied
for the 50,000
ton Hydraulic
Die Forging
Press. Dimen-
sions were 45"
wide x 1.5"
high x 10'3"
long.

**Struthers
Wells**

STRUTHERS WELLS CORPORATION

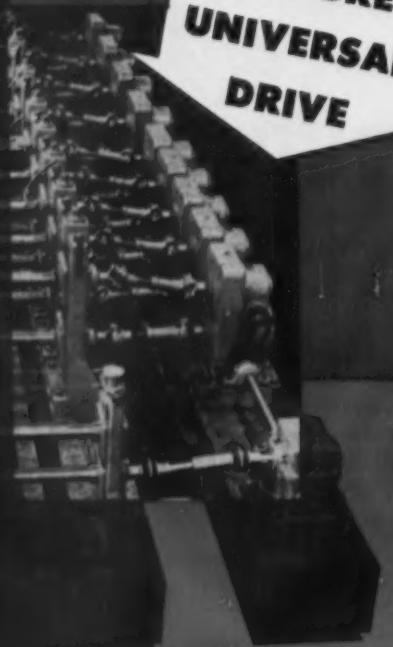
Titusville, Pennsylvania

Plants at Titusville, Pa. and Warren, Pa.

LEADING THE INDUSTRY IN DESIGN . . .

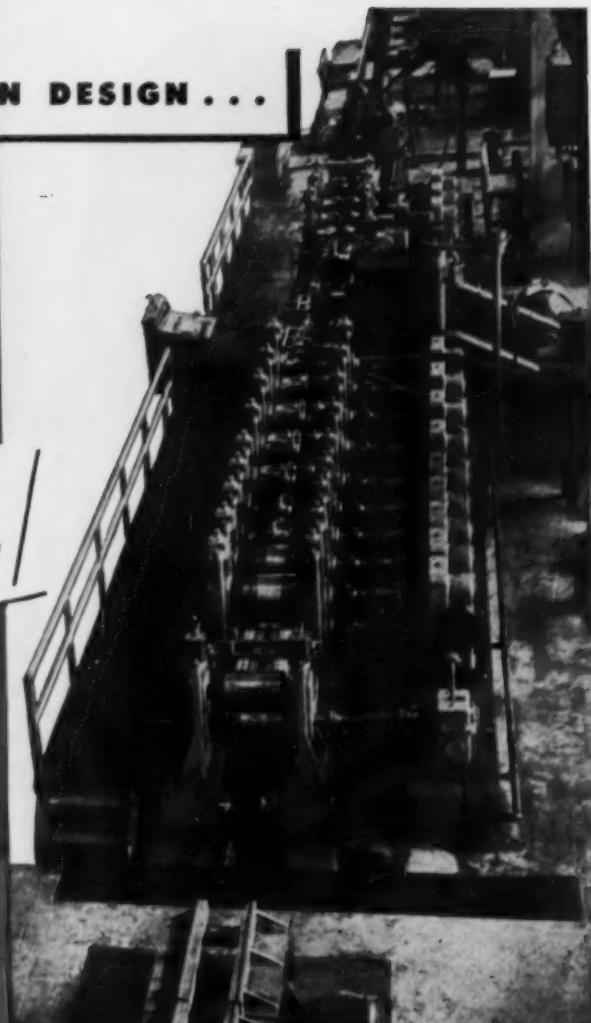
ETNA
TUBE MILLS

**FEATURE
UNIVERSAL
DRIVE**



Etna Universal Drive

You'll notice a trend toward Etna's modern machine design. Etna has sold more Universal Drive Mills than all other manufacturers combined. The Universal Drive provides greater accuracy in the forming of the tube, and allows an easier change from the manufacture of one diameter tube to another.



PERMANENT OIL COOLED TRANSFORMER

For greater efficiency an *Oil Cooled Transformer* is incorporated into the machine. It is a permanent unit and never has to be replaced. Cooling with oil eliminates the necessity to dry out the transformer after each day's work, which is necessary when water is used as a transformer coolant. Etna Mills . . . Built for continuous operation. Write for complete details.

Abbey **ETNA** *Company*

3420 MAPLEWOOD AVE., TOLEDO 10, OHIO



McLouth

HIGH QUALITY

Steel

We are now operating the first Oxygen Steel Process in the United States. This dramatic new method of refining is producing high quality steel with a low nitrogen content.

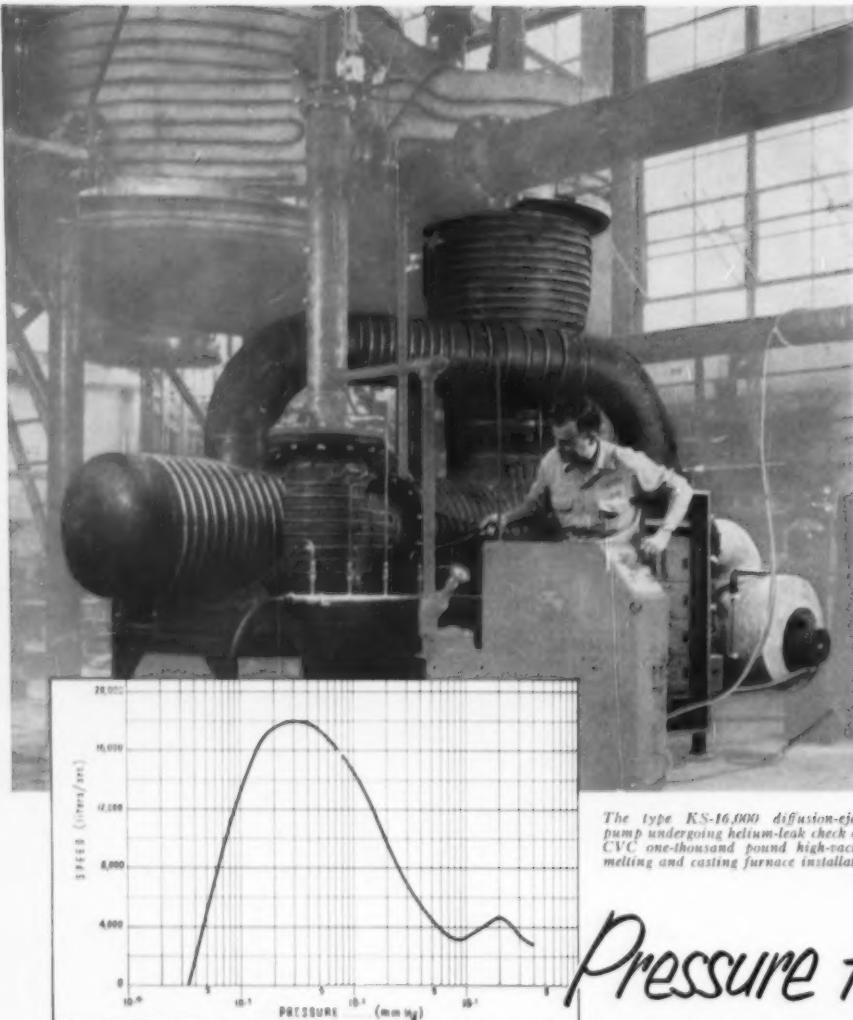
The advantages of the Oxygen Steel Process are another reason why McLouth high quality sheet and strip steels will serve you better in the product you make today and the product you plan for tomorrow.



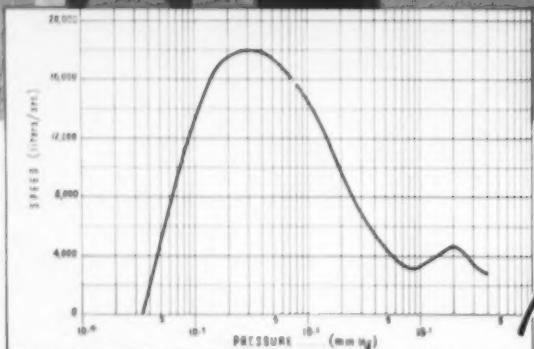
McLOUTH STEEL CORPORATION

Detroit, Michigan

MANUFACTURERS OF STAINLESS AND CARBON STEELS



The type KS-16,000 diffusion-ejector pump undergoing helium-leak check on a CVC one-thousand pound high-vacuum melting and casting furnace installation.



Type KS-16,000's performance curve.

with this new CVC high-vacuum pump

Removing 1,000,000 micron-liters of gas a second from a furnace chamber—that's the task of CVC's new diffusion-ejector pump, type KS-16,000.

1,000,000 micron-liters a second, or 12.5 pounds of air per hour, means that this single pump can exhaust a one-thousand pound melting and casting furnace smoothly and swiftly and maintain the desired operating pressure throughout outgassing periods.

1,000,000 micron-liters a second also means that CVC is able to supply efficient pumping for the tremendous gas loads of the five-thousand and ten-thousand pound high-vacuum furnaces metallurgists plan for the near future.

This high-speed, high-vacuum pump is the latest in a series of advances made in the CVC laboratories—advances helping to make vacuum metallurgy an

accepted and profitable production process.

Other features of the type KS-16,000:

1. Speed for air is 18,000 liters a second at 4 microns Hg (see chart). Speed for hydrogen is 42,000 liters a second at 6 microns Hg.
2. Ultimate pressure is 4×10^{-4} mm Hg.
3. Limiting forepressure is 10 mm Hg.
4. Clearance between jets and pump casing is extra wide and unobstructed. Dust particles found in various metallurgical processes will not clog jet action.

For further information about the type KS-16,000 or about the use of high vacuum in metallurgy, write to **Consolidated Vacuum Corporation, Rochester 3, N. Y.** (a subsidiary of **Consolidated Engineering Corporation, Pasadena, California**).



Consolidated Vacuum Corporation

ROCHESTER 3, N.Y.

CVC sales now handled through Consolidated Engineering Corporation with offices located in: Albuquerque • Atlanta • Boston • Buffalo • Chicago • Dallas • Detroit • New York • Palo Alto • Pasadena • Philadelphia • Seattle • Washington, D. C.

Report To Management

Lower Taxes Are Coming

Look for substantial tax cuts in 1956. A significant lowering of tax rates will be an inevitable, and agreeable, by-product of continued booming business.

Incomes are climbing for individuals and business. As a result, the government take on taxes is higher than estimated. If the trend continues, the government can cut taxes without reducing revenues below budget level.

A balanced budget for the 1956 fiscal year is likely. Unless government expenditures are increased for some unforeseen reason, the balanced budget can be maintained on lower income tax rates.

There will be some pressure within Congress to step up government spending. Just as with individuals, the temptation to spend all the income and more is strong in Washington. Saving and economizing is not easy to sell to the government, even with an economy minded administration.

Dividends Will Multiply

A good cut in personal and business taxes will be one of the best ways of insuring continued uprends of business. It's not hard to see that an increase in personal takehome pay will stimulate buying.

Capital expenditures should mount if tax cuts are substantial enough to show important increases in profits after taxes. Increased buying power at both corporate and personal level is the best guarantee of good times.

It's Good Politics

Remember too that 1956 is an election year. You haven't forgotten that the big campaign promises of the Administration were lower taxes and a balanced budget.

Republicans are determined

to go before the electorate with these promises fulfilled. With the money coming in on the wings of the boom and some valid reasons for reducing expenditures, tax cuts can't miss.

Don't Apply the Brakes

There is still some concern within the Administration over boom tendencies. Some would like to see credit curbs, higher stock margins and other checks applied to the economy.

Business tends to differ with

this line of thought. Many industrial leaders (it isn't coincidence that they are the successful ones) believe that curbs of that nature would be dangerous to the economy.

There are no danger signs

at this time that warrant such tactics. Credit is high, but not dangerously so. Prices are high but not inflationary. Spending is up but so are savings. Stocks are climbing, but so are dividends.

What would it take

to upset the applecart? That's hard to say, but there is a lot of psychology connected with economics. A forced slowing down could lead to voluntary cutbacks. This just isn't the time to retrench.

Be Kind to Your Secretary

If you have a good secretary, see that she's happy with her job. She is a scarce commodity and difficult to replace.

Three-fourths of all clerical and

sales job openings are for stenographers and typists. Many areas are engaged in recruiting programs to bring out-of-area stenographic help to local business and industry. Washington, D. C., California, and Illinois are areas where the secretary shortage is most noticeable.

INDUSTRIAL BRIEFS

Gets Contracts . . . The Girdler Co., Louisville, was awarded a contract by B. F. Goodrich Chemical Co. covering engineering and construction work to be undertaken in connection with expansion of Goodrich's Hycar synthetic facilities in Louisville. Girdler also received a contract from National Aniline Div. of Allied Chemical and Dye Corp. to design and erect a combination hydrogen and carbon monoxide plant at Moundsville, W. Va.

Expanding Program . . . Frederick W. Richmond announced an expansion program of the newly acquired National Valve and Manufacturing Co. to keep pace with demand for power piping systems for utilities, chemical plants, atomic energy installations and other industries. Navco was purchased by Mr. Richmond and a group of investors for \$4,500,000.

Freight Car Orders . . . Southern Pacific Co. will add 950 new box cars in its current car building program. Of the total, 750 will be constructed in the road's own shops at Sacramento, Calif.

An order for 75 flat cars for the St. Louis Southwestern Railway Co. has been received by the Greenville Steel Car Co., Greenville, Pa. The flat cars are expected to be used in "piggy back" service.

Nuclear Research . . . Formation of a Nuclear Energy Dept. has been announced by the National Research Corp., Cambridge, Mass., co-ordinating activities of the institute in the atomic field in which it has been active for almost 15 years.

Society Moves . . . The Steel Founder's Society of America will move its headquarters to 606 Terminal Tower Building, Cleveland, on August 4. The society has occupied its present headquarters at 920 Midland Building since 1936.

Bought Out . . . The Mechanical Devices, Inc., a Michigan corporation, has recently purchased the assets of the Peabody Industrial Co., which was engaged in the manufacture of the Peabody Portable Hardness Tester. National representation is being rapidly set up in states where industrial activity is highly concentrated. Service on all Peabody equipment will be handled by the company.

A New Division . . . Vapor Heating Corp., Chicago, has recently purchased Industrial Engineering Co. of Vermillion, S. D. Industrial Engineering will be incorporated and operated as a division of Vapor Heating Corp.

A New Firm . . . National Lead Co. announced the formation of Abbey Chemicals, Ltd., in London, Eng. The new firm will produce chemicals for industry which have found wide acceptance in the United States and are in increasing demand in England.

Adding a Plant . . . Consolidated Chemical Industries Inc. will build a large contact sulphuric acid plant at Le Moyne, Ala. Construction will get under way at once and completion is expected by mid 1956. The new plant will incorporate the latest advances in engineering design.

Industrial Plant . . . Continental Motors of Canada, Ltd., has bought a nine-acre tract of land at St. Thomas, Ont., on which it will build an industrial plant to serve its mounting list of Canadian customers. Completion of the new building is expected to be sometime before winter.

Worldwide Sales . . . Consolidated Engineering Corp. has set up a worldwide sales organization by appointment of export representatives in 19 countries in Europe, Asia, Africa and Latin America.

Furnace Contract . . . The American Welding & Manufacturing Co., Warren, O., has awarded a contract to the Gas Machinery Co., Cleveland, for a bar furnace to be used for annealing stainless and low carbon bars. It will have automatic controls, and will be fired with excess air burners.

Acquires Business . . . Thomas S. Whiteway has acquired White-way Stamping Co., Euclid, O., through purchase of interests held by Carl F. Lange, former vice-president and secretary. Mr. Whiteway had been associated in the company, founded in 1924 by his father, the late Harry S. Whiteway, Mr. Lange, and the late Edward R. Marback.



. . . by Milford's 5 plants and 20 offices, strategically located to give you top quality tubular rivets, fast


THE
MILFORD
RIVET & MACHINE CO.

Plants: Milford, Conn.; Norwalk, Calif.; Elyria, Ohio; Aurora, Ill.; Hatboro, Pa.

Offices: Atlanta, Chicago, Cleveland, Detroit, Fort Worth, Indianapolis, Newark, New York, Pittsburgh, Racine, St. Louis, St. Paul, San Francisco, Seattle— and Norwalk, Calif.; Stratford, Conn.; Charlotte, N. C.; Seneca Falls, N.Y.; Jenkintown, Pa.; Westwood, Mass.

Headquarters for RIVETS
(Tubular split and special cold-formed)
and Rivet-setting Machines

A NEAT WAY TO PLAY SAFE: JAL-TREAD FLOOR PLATE



Jal-Tread floor plate combines the strength and durability of high quality steel with a neat, distinctive checkerboard pattern scientifically designed for *safety*.

Whatever your application . . . in new construction . . . new equipment . . . or replacement jobs, Jal-Tread will assure you of these advantages:

Safe Footing—300 miniature squares per square foot—all of uniform height—provide maximum linear friction surface that protects you against lost-time accidents.

Easy Fabrication—The Jal-Tread straight line gutter pattern simplifies welding, flanging, shearing, bending, punching, and

drilling operations. Experience shows that Jal-Tread can be cold-formed on standard plate bending machines.

Easy Cleaning—The Jal-Tread straight line gutter pattern permits quick, thorough sweeping and draining in any direction.

For safe, long-lasting flooring always specify J&L Jal-Tread . . . it's available at leading distributors everywhere.

Jones & Laughlin
STEEL CORPORATION — Pittsburgh



Aluminum Diet Reduces Auto Weight

Average car carries 30 lb of aluminum . . . Trend will result in more than 100 lb of light weight metals per car . . . Stock savings plans lure salaried workers . . . Production records set—By T. L. Carry.

• THE TREND toward more extensive use of aluminum in cars has increased every year since the end of World War II until the average amount in today's car is 30 lb.

Predictions are that the increasing use of the metal will find the average auto containing as much as 100 lb by 1970.

Heaviest use of aluminum is found today in automatic transmissions and engine components. But it is also used for such things as headlight housings and automotive trim.

Biggest user of the metal in this year's cars is Chrysler Corp. The firm uses about 70 lb in each auto it produces.

Chrysler has found that aluminum stampings and castings are not only cheaper in some cases but they reduce the weight of a car by as much as 200 lb. Any weight reduction helps to make a car more economical to operate because the engine has a smaller load to pull.

Engineers at the corporation are constantly seeking ways to use more light material in autos for this reason. Aluminum is considered one of the best substitutes for steel because, when designed properly, it is almost as strong as ordinary body steel and at the same time is easier to work with.

Aluminum Radiator . . . The weight of a car has nothing to do with its road keeping qualities, they contend. Redesigned suspensions and a lower center of gravity in an auto would compensate for any loss of weight.

Right now, the industry is toying with the idea of using aluminum radiators. The heat dissipating qualities are no better than the present copper and brass but the supply of aluminum is more plentiful than the other two metals.

The possibility of an all aluminum car at some time in the future is remote. It is not because it can't be done or that the car wouldn't be as good. The costs of producing such an auto would be prohibitive.

But predictions that more light materials will be used in future automobiles boils down to a simple case of availability. In addition to other elements, the earth's crust is about 13 pct aluminum, 8 pct iron, 2 1/4 pct magnesium and 1 pct titanium.

More Plastics . . . When you consider the fact that three times as much can be produced from 1 lb of aluminum than from the same amount of iron, the conclusion that more aluminum will be put to use

quickly becomes self evident.

Aluminum, however, is not the only light weight material being used in today's cars. Plastics have also come in for a number of uses. Some speedometer gears are presently being made from nylon. Heater housings in Chrysler cars are also made of plastic and plastic headlinings have replaced the conventional covering in the Plymouth station wagons. Again, these materials are being used either because they are cheaper to use or easier to install in an auto. The amount being used will increase as ways and means are found for cheaper production and if it is decided that plastic material can do a better job than those being used presently.

Stock Plans Offered . . .

General Motors Corp. has joined Ford in the fight to stave off any union organizing attempts of salaried employees. The recently announced stock-savings program is a step in that direction.

Under the plan, all salaried employees, presently numbering over 100,000, with one or more years service could participate on a voluntary basis.

The workers would be permitted to contribute up to 10 pct of their salary plus cost-of-living allowances, which would be invested one-half in government bonds and one-half in GM common stock. GM would contribute 50 cents for each \$1 invested by an employee but GM's contribution would be invested entirely in stock.

The stock option program is divided into two parts, a savings plan and a retirement plan. Classes



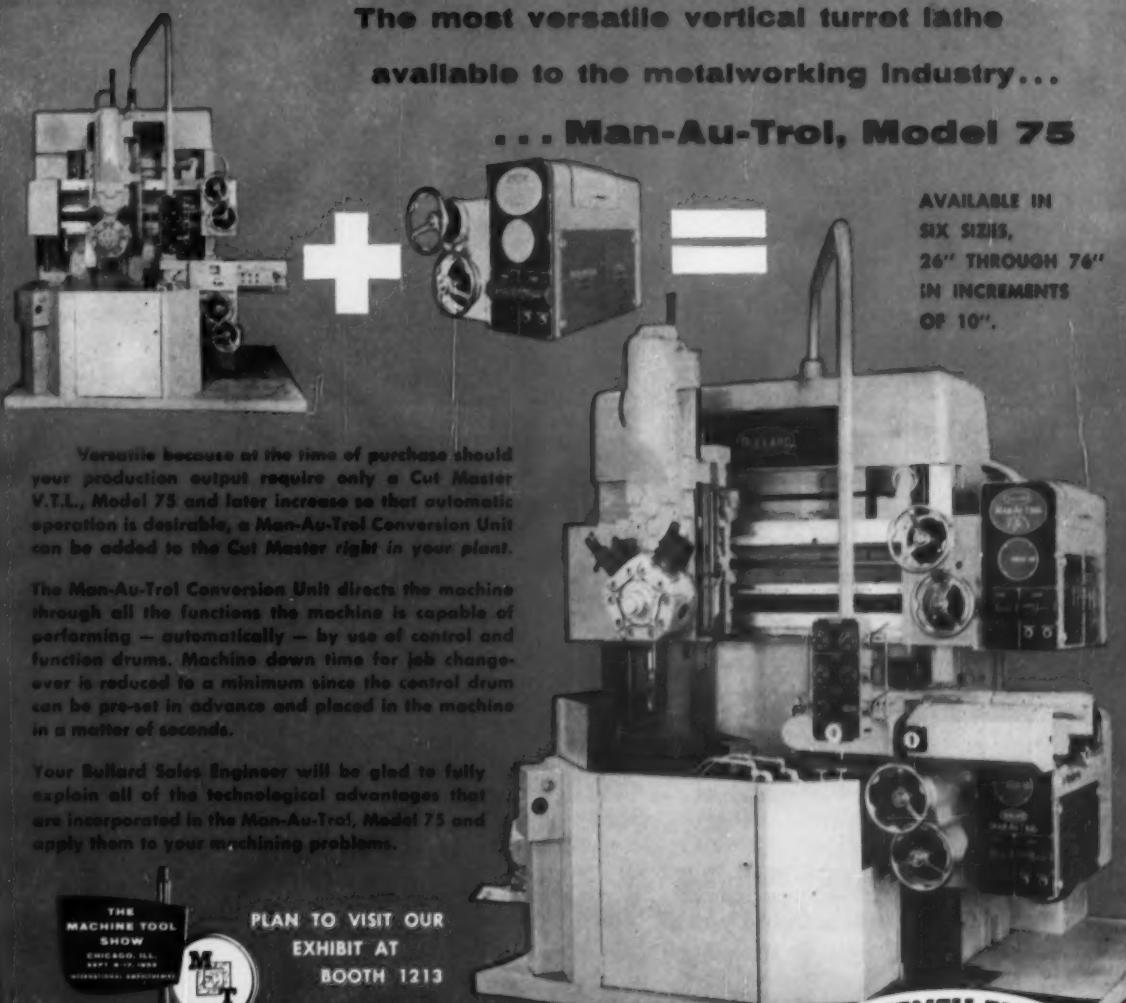
"It seems to have picked up a strange whining noise."

Machine Tools for Today and Tomorrow!

The most versatile vertical turret lathe
available to the metalworking industry...

... Man-Au-Trol, Model 75

AVAILABLE IN
SIX SIZES,
26" THROUGH 76"
IN INCREMENTS
OF 10".



Versatile because at the time of purchase should your production output require only a Cut Master V.T.L. Model 75 and later increase so that automatic operation is desirable, a Man-Au-Trol Conversion Unit can be added to the Cut Master right in your plant.

The Man-Au-Trol Conversion Unit directs the machine through all the functions the machine is capable of performing — automatically — by use of control and function drums. Machine down time for job change-over is reduced to a minimum since the control drum can be pre-set in advance and placed in the machine in a matter of seconds.

Your Bullard Sales Engineer will be glad to fully explain all of the technological advantages that are incorporated in the Man-Au-Trol, Model 75 and apply them to your machining problems.

THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
APRIL 26-29, 1955
INTERNATIONAL EXPOSITION



PLAN TO VISIT OUR
EXHIBIT AT
BOOTH 1213

WE INVITE YOUR INQUIRIES — CALL OR WRITE
YOUR NEAREST BULLARD SALES OFFICE, DISTRIBUTOR

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

SEVENTY FIFTH
BULLARD
ANNIVERSARY



FUEL COST 11.4c

PER 52-POUND GEAR with Selas Heat Processing

For hardening gears, pinions, segments, rollers, rings, shafts, cylinders, wheels and cams, Selas heat processing methods are unequalled for economy, speed and versatility. With equipment as shown above, for example, 52-lb. spur gears, with 24" pitch diameter and 1½" face, are tooth-hardened at a rate of 10 per hour, with a fuel cost of only 11.4c each.

Selas heating, using regularly-supplied fuels (manufactured gas, natural gas or propane), premixed with air . . . permits precise localized heating . . . to develop full surface hardness and controlled depth

of hardness. The operation can be fully automatic. Bottled oxygen is not required.

In heat treating, brazing, forging, strip annealing, and other continuous operations involving both ferrous and nonferrous metals, Selas Engineers can design heat processing equipment to help speed production, improve product quality and reduce manufacturing costs.

Write for descriptive data concerning your heating requirements.



SELAS

**CORPORATION OF AMERICA
PHILADELPHIA 34, PA.**

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
July 9, 1955	147,085*	25,045*
July 2, 1955	166,742	28,138
July 10, 1954	90,323	15,846
July 3, 1954	113,103	29,938

*Estimated Source: Ward's Reports

under each plan would be formed each year. The savings fund plan would mature at the end of 5 years and settlement would then be made with the worker. The retirement plan would not mature until an employee retired or otherwise terminated his services. A participating worker would not have to decide which plan to invest his savings in until he made his final payment into the program for a year. Thus, it is possible for a worker to alternate his investments between the savings and retirement programs.

In announcing the new stock option plan, Harlow H. Curtice, president of GM, said that the program "is designated to encourage employees to save regularly and to provide an opportunity for more of them to become stockholders in the company."

At the same time the stock purchase plan was announced, it was revealed that the GM board of directors had approved a 3-for-1 split in the corporation's common stock. Both the stock split and the savings plan are expected to become effective in October of this year.

Production:

All first half records topple.

The auto industry wound up the first 6 months of this year with a record breaking production of 4,258,023 cars and 643,248 trucks. The new record was 39 pct above the same period in 1954 and almost 26 pct better than the previous peak period in 1951.

Each of the Big Three producers broke all records for any 6-month period in their history. Up to the end of June, General Motors Corp. produced 2,458,646 cars and trucks

in the U. S. and Canada compared to 1,857,019 for the same period last year. Chrysler Corp. turned out 848,129 vehicles for the first 6 months as compared to 426,720 in 1954. Ford's production for the first half of 1955 was 1,344,568 units. Production for the first 6 months of 1954 totalled 1,090,200.

Hard Selling Ahead

Now the question is how soon the record breaking output is going to ease. In past years, July 4 has traditionally marked the end of the peak selling period for both new and used cars. With this in mind, there is no doubt that production is going to taper off but no one knows for sure just how much.

One factor that will act as a sales stimulant for the remaining months of this model year is the definite possibility of a price increase on next year's cars. Nobody has admitted it yet, but it is common knowledge that the average price of a 1956 car is going up anywhere from \$25 to \$50. The increases will be due in part to the sizeable wage boosts recently won by both the auto workers and the steel workers.

AUTOMOTIVE NEWS

At the same time, competition among dealers is going to get rougher as the cleanup period for old models progresses. This will offset any price increase this year and will be a deciding factor in how much a late customer will pay for a car.

Congress Calls GM

Senator Harley M. Kilgore, D., W. Va., is going to have one more shot at making political hay of the antitrust issue. He's saved his biggest gun, General Motors, for last. GM declined an "invitation" to testify at earlier hearings, and Kilgore now threatens to subpoena the firm for hearings after Congress adjourns. Bets are that GM will show without the official paper, and anything they say will make headlines in the dull dog days after adjournment.

GM President Harlow H. Curtice stated he was not an expert on mergers when first asked to appear.

THE BULL OF THE WOODS

By J. R. Williams



Cincinnati Filmatic 18" Plain Grinder

Adds the final touch of quality to *HardClad** columns



HardClad* radial drill columns are ground to a high degree of accuracy and finish on this CINCINNATI FILMATIC 18" x 72" Plain Grinding Machine.



*Note: HardClad is the trade name for the Cincinnati Lathe and Tool Co.'s flame hardened radial drill column.



Assembling a radial drilling machine, in the plant of the Cincinnati Lathe and Tool Co.



CINCINNATI FILMATIC 18" Plain Grinding Machine



Accuracy begets accuracy. It's especially true for radial drill columns, where high-quality finish and accurate, straight sizing are basic considerations to high-quality performance. HardClad* radial drill columns, a new non-scoring development by Cincinnati Lathe and Tool Co., are ground at low cost and to the highest standards of quality on the CINCINNATI FILMATIC 18" Plain Grinder illustrated here. These machines have many advantages for quickly grinding large work to the highest quality desired:

FILMATIC grinding wheel spindle bearings . . . outlast the machine; never require adjustment

Automatic wheel balancing . . . in seconds; while the machine is running

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Air Force Pushes Antitrust Exemption

Want continued exemption from antitrust laws for defense contractors who pool know-how, plant facilities . . . Congress is undecided . . . State Dept. will continue aid to nations trading with Reds—By G. H. Baker.

♦ AIR FORCE lawyers make a strong pitch for continuing the exemption from antitrust laws that are granted certain key defense contractors. (Under the Defense Production Act, contractors that want to pool their know-how and plant facilities for defense work are granted immunity from antitrust prosecution.)

This exemption is of the greatest importance to the Defense Dept., and particularly to the Air Force, Congress has been told. The Air Force, for example, offers the antitrust immunity clause to firms producing B-47 bombers, F-84 fighters, and J-47 jet engines. Navy offers it to firms making guided-missile equipment and fire control equipment.

Congress hasn't made up its mind yet whether to shut off the exemption at the end of this month, or to extend it along with the rest of the Defense Production Act. A lot of heat is being generated in both wings of the Capitol on this controversial loophole.

Check Hoover Commission . . . Defense Secretary Wilson has named Charles A. Coolidge of Boston to look into Hoover Commission contentions that the Defense Dept. can save more than \$2 billion a year by trimming waste, duplication, and inefficiency.

Most of the Hoover Commission's criticism of the Defense Dept. revolves around what the probbers call "wasteful" procurement methods and government-owned enterprises like scrap-baling and retail stores that compete directly with private enterprise.

Mr. Coolidge, 60, was Assistant Secretary of Defense from November, 1951, until December, 1952, and prior to that served as deputy director of the State Dept. Office of International Security Affairs.

The committee that studied the Defense Dept. business-type operations is headed by Charles R. Hook, chairman of the board, Armco Steel Corp. Mr. Hook's committee points out that "the most obvious opportunity to make real savings in the cost of government is in the Defense Dept. because it has three-fourths of the government's payroll and more than 60 pct of its total budget."

They Help Reds . . . State Dept. says it intends to continue sending aid to Britain, France, Italy, and Germany in the new fiscal year, despite the fact that these countries have shipped industrial commodities to Communist countries.

ities to Communist countries.

The Battle Act, passed by Congress in 1951, requires the Administration to tell Congress if it proposes to keep on helping countries that trade with Communist countries.

A total of \$603,255 in industrial commodities was shipped to the Reds by England, France, Italy, and Germany, State Dept. estimates. Of this total, goods valued at \$443 went to Communist China.

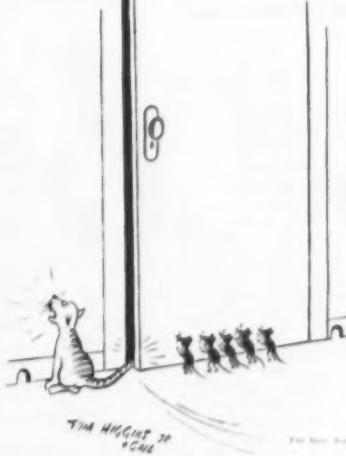
Want Fireballs . . . Caliber of governing bodies—federal, state, and local—can be substantially improved if up-and-coming young executives will lend new blood and new skills to the creaky civil service system by serving short-term appointments.

Deputy Attorney General William P. Rogers is pushing this proposition, and suggests that young men and women in business should organize a "talent pool" from which government could draw top-notch executives. He observes that a year or two in government service is usually mutually advantageous to both the young executive as well as to the government.

There's a vast reservoir of human energy and talent (about 2.5 million young people reach 21 every year) which the government needs badly and is not now getting. The Rogers plan is to tap this rich source.

Rogers points out that the efficiency of governing bodies would tend to rise if they had access to a "stockpile" of young executives available for government service.

Turn Page



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By switching to flash butt-welding of extruded sections, we helped one customer cut fabricating costs of a jet engine ring from \$67.85 to \$41.95. A saving of \$25.92 per ring — roughly 40%.

This is one of many cases in our files where rolling and flash butt-welding of bars, sections, extrusions or plate has proven to be the most economical and practical method of fabricating circular components. Shown below are some other "American Welded" components.

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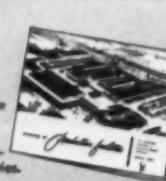
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Conflict:

Fight looms over Hoover plan to push private power.

Political temperatures are soaring like the summer heat over the contents of a new Hoover Commission report which may be widely referred to on the campaign circuits next year.

Dealing with water resources and power, the study recommends adoption by Congress of a national power policy that would eliminate much of the disparity between costs to the user of public and private power. It would permit privately-owned utility firms to compete on more equitable terms with public power producers.

Federal Plant Grows

In Congress and elsewhere, this principle is generally applauded by advocates of greater individual and corporate enterprise. At the same time it is under attack by public power partisans.

Federal power capacity, the commission points out, is becoming a greater factor in total power potential and will comprise about 17 pct of all generating capacity when programs now authorized are completed. Prices charged for federal power average 40 pct under actual value, the Hoover group reasons. It calls for a sharp increase in rates and for permission for private utilities to buy a share of federal production.

Water needs, says the group, will rise by 145 pct in the next 20 years as industrial and home use increases. Proposed is a permanent Water Resources Board with both Cabinet and public members to advise the President on policies for making the most efficient use of the nation's water supplies.

Offer Agency Plan

Military procurement officials are doing an inefficient job of providing the armed forces with ordinary commercial-type items, and need help in the form of a civilian-managed supply agency.

Based on this reasoning is the Hoover Commission recommendation for creation of a new Defense Supply and Service Administra-

tion within the Defense Dept. Like the Army, Navy, and Air Force, it would receive policy direction from the Defense Secretary.

Items within the jurisdiction of the new agency would include commercial lines of cars and trucks, spare parts, fuels and lubricants, hardware, office equipment, medical and dental supplies, food, and clothing. In fiscal 1955, about \$4 billion was spent for these products.

Commission contention is that the organization could lead to savings of more than \$2 billion a year. Its administrator, to be appointed by the President, eventually would get a staff of career specialists, though initially he would have to get along with transferees from the military departments.

WASHINGTON NEWS

before the House of Representatives.

It expands the manganese-buying programs at railheads from 19 to 38 million tons. It doubles purchase authorizations for stockpiling of tungsten, chromite, mica, asbestos, beryl, and columbium-tantalum.

Buying Will Stop

Quotas for three existing manganese depots in the West would be hiked from 6 to 12 million tons each, and two new depots, each with 12 million ton quotas, would be created to purchase ores from the southern Appalachian and Ozark-Cushman areas in the East.

Similar specific stockpile bills are being opposed by the Eisenhower Administration on the grounds that simple general stockpiling authority is sufficient, and that specific required purchases are not feasible.

Toughen Trust Laws

President Eisenhower has signed into law two bills toughening up the antitrust laws, and heavy pressure is being applied by the majority in Congress for enactment in this session of a third.

Two bills, one increasing the fine for antitrust law violations from \$5000 to \$50,000, and another permitting the government to sue for actual damages suffered because of violations, are now law.

Vote Channel Funds

A Senate Appropriations committee has voted \$6 million to begin work on the Delaware River deepening project following President Eisenhower's approval of the project.

The sum is voted with the stipulation that when a national policy of requiring local participation in such projects is adopted it will apply to the \$91 million Delaware program. The project will deepen the channel to 40 feet from Philadelphia to Trenton.

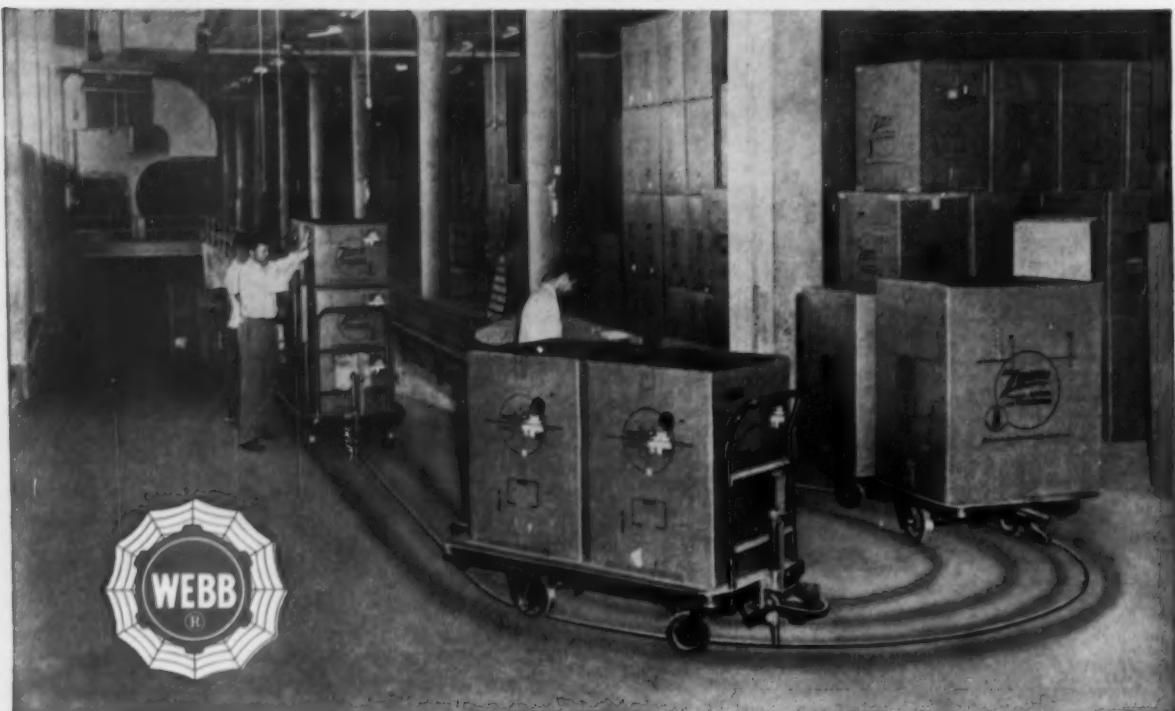
The House has approved only \$100,000 for the project, but is expected to go along if the full Senate approves the \$6 million.



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Yes, for the first time, here is a Towveyor installation that also travels up and down concrete ramps, providing a smooth and constant flow of materials between floors. This modern Towveyor installation is the backbone of materials handling in this huge plant. Nearly 4,000 feet of Towveyor track winds its way through the various departments, bringing cabinets and other materials in, and removing finished TV sets to storage or shipping.

The Towveyor system consists of a motor driven endless chain that travels in a trough in the floor. Material is carried on 750 tow trucks. Each truck is equipped with a tow pin which is manually lowered into a narrow continuous slot in the floor to engage the Towveyor chain. Trucks are disengaged from chain by raising tow pin. Tow pin is spring locked in the up position and locked in a slot in the

down position for positive safety on both flat and ramp travel of tow trucks.

This efficient Towveyor system provides faster and better regulated flow of cabinets from receiving docks to warehouse. Finished radios and television sets are smoothly moved from final assembly to shipping. Picture tubes, component parts and even corrugated cartons are carried in a carefully coordinated manner to their proper stations. Maximum daily capacity of system is 10,000 cabinets delivered to warehouse and 10,000 finished sets to shipping.

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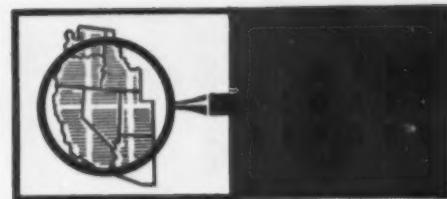
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643



Aluminum Cuts Lockheed Die Costs

Production engineers use aluminum as die backing . . . For short runs it cuts costs over zinc-base alloy . . . Metal cost is lower and less metal is used . . . Suppliers look for Ford expansion—By R. R. Kay.

• CAN YOU use a 700 pct saving in cost of cast die material? Here's how you can make it.

Engineers at Lockheed Aircraft Corp., Burbank, Calif., using aluminum as die backing instead of zinc-base alloy, make dies at one-seventh the cost for die metal.

It's good for short runs—size of die doesn't matter. A few uses so far: drop hammer dies, draw press tooling, and stretch form blocks.

List Advantages . . . Dies cast from aluminum are cheaper for two reasons:

(1) Bulk metal cost is less. Though aluminum costs 17 pct more per pound than zinc-base alloy, it weighs 66 pct less.

(2) Less metal is used. Stretch form blocks cast of aluminum need be cored out to only 2-in. wall thickness vs minimum 4-in. wall thickness for zinc-base alloys.

That's what G. A. Fitzpatrick, assistant general manager of Lockheed's California Div., finds. And he claims more advantages: lighter-weight tools, and better adhesion when used with epoxy plastic facing.

Lockheed machines large, integrally-stiffened aircraft structures from slabs of aluminum. As much as 90 pct of the original slab weight ends up in scrap. Now, the scrap goes to the foundry and comes back as aluminum ingots for casting large dies.

Since the first of the year, the company's die shop made 56 aluminum die castings: total weight, 40,190 lb aluminum at \$5224. It would have taken 224,130 lb of zinc-base alloys at \$35,860 to make the same tools. Savings: \$30,636. By year



ALUMINUM reduction pot lines at Kaiser Aluminum & Chemical Corp. plant at Mead, Wash., have an annual capacity of 350 million lb.

end, Lockheed sees a \$100,000 saving in die fabrication.

This method is worth real green stuff to plants generating lots of aluminum scrap.

Ford Expands . . . Here's good news for metalworking plants supplying the automobile assembly industry. Look for a huge new Ford Motor Co. plant in the Los Angeles area.

Reliable reports have it that the company bought 200 acres for a multi-million dollar Mercury assembly unit to replace present Los Angeles plant now employing 1400. Increased production schedule will call for a big boost in workers.

Auto parts makers would do well to keep a sharp eye on this development. Ford's West Coast purchases

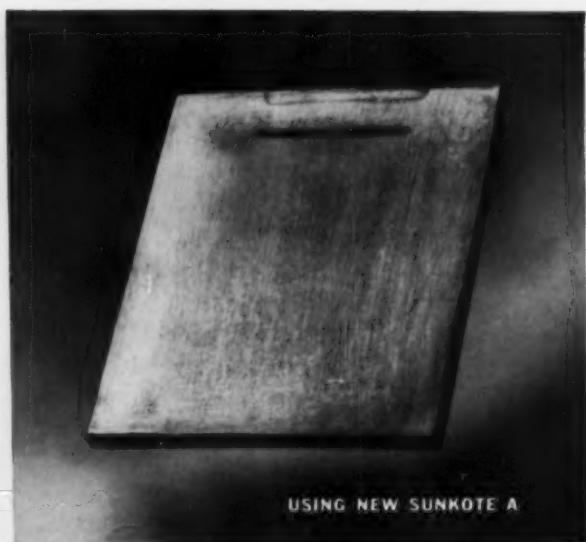
of metalworking parts and sub-assemblies are now about \$50 million per year.

Gas by 1956 . . . Pacific Northwest is getting set for 1956 delivery of natural gas. Gas-distributing companies will spend \$70 million in the next five years converting to natural gas and expanding present facilities.

Seattle Gas Co. has awarded \$1 million in contracts for laying new pipe in a \$14-million expansion program. Portland Gas & Coke Co. will spend \$16 million. British Columbia Electric Co., Vancouver, B. C., plans an \$18-million outlay. Cascade Natural Gas will spend \$11 million; Washington Gas & Electric Co., \$6 million; Spokane Gas & Fuel, \$5 million.



USING ORDINARY SLUSHING OIL



USING NEW SUNKOTE A

Humidity Cabinet Test proves superiority of new coating oil. Using ordinary slushing oil, steel test panel (on left) shows harmful rust after only 100 hours in humidity cabinet with relative humidity of

100% at 120 F. An identical steel test panel (above right), protected by new Sunkote A, shows no rust or stain whatsoever after 200 hours under same rust test conditions of high humidity and temperature.

Sun Oil Company Announces Sunkote A

**a new, low-cost rust preventive coating
for hot-and-cold rolled strip and sheet steel**



SUNKOTE A is easily applied by dip, roller, or spray. Special compounding provides extra protection against rust and stain at lowest cost.

Sunkote A is specifically compounded to protect hot-and-cold rolled strip and sheet steel against rust and stain for long periods in storage and in transit.

Economical to use, Sunkote A is moderately priced... gives maximum coverage and protection... can be applied by all usual methods... is easily removed by any of the normal cleaning processes.

For complete information about this new product, see your Sun representative... or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-7.



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Tool Builders Rush Show Exhibits

Chicago show will feature automation, latest innovations . . . Most builders will also push bread and butter lines . . . Theatrics ruled out by Show rules . . . Work started on exhibits—By E. J. Egan, Jr.

♦ BETTER BE on the lookout for "Wet Paint" signs at the Machine Tool Show coming up in Chicago, September 6 through 17. IRON AGE interviews with builder-exhibitors about their Show plans almost invariably produce comment like this: "Some of our stuff will be so new that the paint won't even be dry when the Show opens."

Builders are really keyed up for this metalworking extravaganza at the International Amphitheater. It's the first joint display venture for members of the National Machine Tool Builders Assn. since 1947. If you had hibernated from the end of the last Show to the opening of the forthcoming one, you mightn't believe your eyes at the progress that's been made in just 8 years.

Many Surprises . . . Even if you've kept fairly well abreast of machine tool design and development during that time, builder's spokesmen say you'll still be due for some surprises.

Emphasis will definitely be on automatic metalworking equipment operating at super speeds and with super precision. Builders aren't permitted fancy gimmicks to attract the attention of Show visitors. The rules governing exhibits are quite specific on this point. They say, in part, "Theatrical, blatant or undignified methods of attracting attention will not be allowed."

This puts it squarely up to the machine tools themselves.

One builder's representative says that the focal point of his firm's display will be a completely automatic machine, the first that

the company has ever made. When asked if this would obsolete his present equipment lineup, he replied in the negative.

He explained that he thought his company's approach to the Show in general was probably fairly typical of the average builder's attitude. He said, "We realize that this is the automation era. If we don't get in the swim we can't expect much of a play at our booth."

Crowd Catchers . . . "So," he continued, "we've gone all out on this one model. It'll work fine and get us a lot of attention—but it will cost a fortune. We'll probably be able to sell it, and maybe three or four others like it, but that's about all. There are only a few shops in the country who could afford the

unit and also have enough work to make it pay for itself."

He thinks that once the average prospect has admired the super deluxe model sufficiently, he'll edge over to the more conventional machines to talk serious business. "Now don't get me wrong," he said. "The conventional equipment is still away ahead of what we had to offer even as recently as a year or two ago. It's faster and more accurate, and even though it still needs an operator, it takes less skill and strength on his part."

Actual exhibit installations are underway at present, will continue right up until the Show's opening date. Months ago all builder-exhibitors were assigned target dates for equipment delivery. They must adhere to this schedule to prevent confusion in assembling and rigging their displays.

Market Survey . . . Visitors registration cards will be used for a comprehensive machine tool market survey, first ever attempted by the industry. The finished analysis will pinpoint visitors geographically, by occupation, by size and type of plant they represent, by their plant products and by the number of employees they have. This is expected to be of great help to builders in seeking new markets for their metalworking equipment.

Orders Up . . . New orders and shipments for screw machine parts rose sharply in May, according to the monthly business index of the National Screw Machine Products Assn. New orders in May were up 61 per cent over the total for the same month last year.



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NATCO ENGINEERS

OVERCOME DISTORTION

DURING MACHINING

WITH

STRESSPROOF®

SEVERELY COLD-WORKED, FURNACE-TREATED
STEEL BARS

The Lead Screw Tapper Spindles of this Natco Three-way Holetapper required machining operations hard to combine without serious distortion.

The front end of each spindle had to be machined as a taper socket for collet application. When the driving keyway and the tool knockout elongated-splined-holes were machined, distortion caused out-of-round taper holes which would not receive the collet correctly.

The rear end of each spindle had to be machined as a driving spline shaft which slides under load. Since the diameter of the spline is relatively small in proportion to the shaft length, any attempt to heat treat caused distortion hard to correct by straightening.

And at the center of each spindle, an accurate lead screw had to be machined by a thread grinding operation. It was found that the finish was much more easily obtained when STRESSPROOF was used.

STRESSPROOF eliminated both the problem of the out-of-round taper holes on the front of each spindle . . and the distortion of the driving-spline-shaft.

STRESSPROOF makes a better part at a lower cost.

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Based upon nearly 70 years of specialized experience, the new Gisholt MASTERLINE machines are ready to give you production far in advance of their time.

Come in and inspect them at close range. Watch them operate. Learn what these new Gisholts can do to cut costs on your work.

Be sure to visit the Gisholt exhibit—Booth 1413, Exhibition Hall.

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The Iron Age

SALUTES

Leonard C. Crewe, Jr. Credits "whatever success he has achieved" to knowing what he wanted at an early age, and being associated with able men who helped and guided him in the wiremaking industry.

Redheaded Leonard Crewe from Tennessee built the Maryland Fine and Specialty Wire Co., Inc., in 1947. Sales of the young company immediately began an upward climb that has continued to the present. This year a new building for wire drawing machinery will increase capacity 50 pct.

When Red Crewe is asked about his success in wiremaking, he quickly begins talking about the men, in and out of the industry, who have guided him. He calls former boss Dave Johnson of Johnson Steel and Wire Co. "one of the finest living wiremakers." He singles out Bethlehem Steel's John Mordica and others as highly beneficial forces in his life.

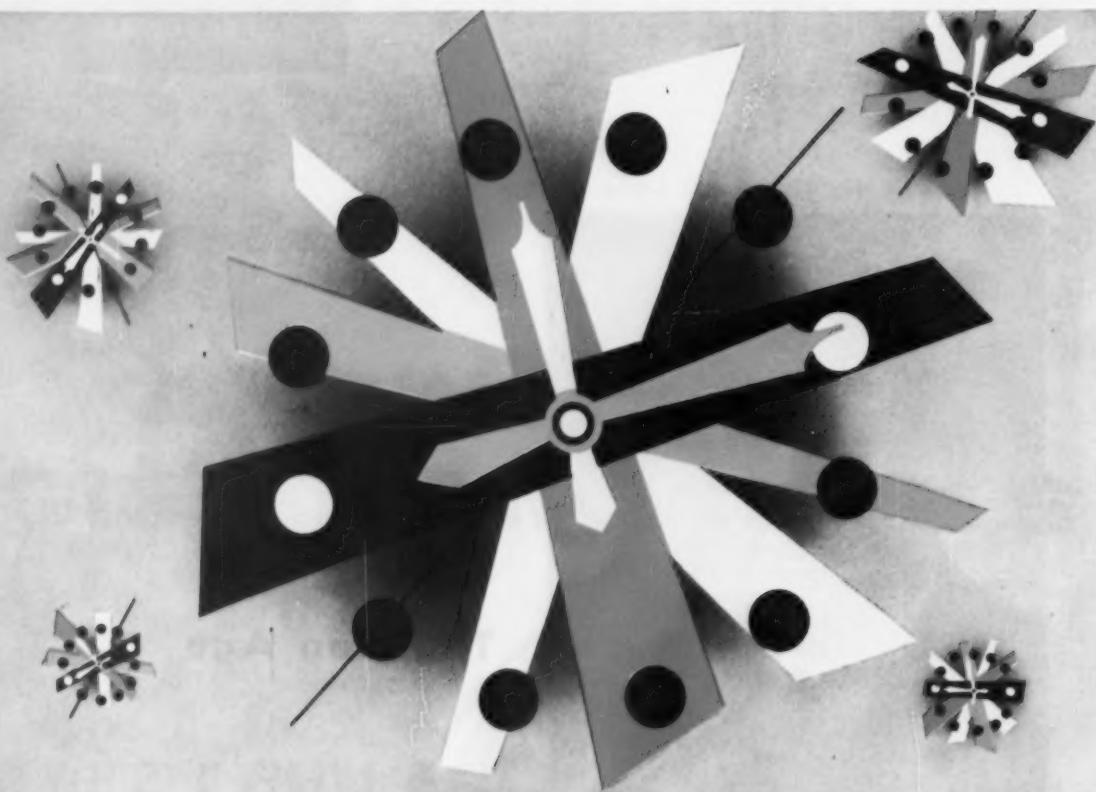
Red has been fortunate in his associations but there have been quite a few other points in his favor. For one thing, he decided early what he wanted to do and spent school vacations working in coal mines, blast furnaces and other rugged spots in and around the steel industry. After finishing his studies at Lehigh University, he went to work for Bethlehem, becoming assistant

superintendent of the Wire Mill at Sparrows Pt. After 15 years at Bethlehem, he went with Johnson Steel and Wire for 2 years, then built his own company. He has a solid steel and wire background, is past president of the Wire Assn.

It's significant that he talks about others rather than himself. His general and business activities are marked by an enlightened concern for people at all levels. He operates a savings and profit sharing plan for his employees; maintains lively contact with them through a company publication.

In the community he is the kind of a man who can't walk down the main street without a dozen people hailing him by his first name. He is chairman of the Cockeysville (Md.) Committee for civic improvement, has worked hard and effectively for other local programs.

He is a friendly man with a fine sense of humor; likes fishing when time permits; squeezes in a game of golf (in the eighties) once a week. Big offhour interest, though, is his family—Mrs. Crewe and four children.



don't kill it — take advantage of it

We have all been given an equal number of hours in every day to use in any way we see fit. We can kill time or take advantage of it. It can be an inexorable taskmaster or a valuable ally. We'd like you to know about a machine that can help you make the most of the costly hours between punch-in and punch-out. It's an Axelson lathe—one of the really fine machine tools built in America today. May we take the time to tell you about it?



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DIVISION OF U. S. INDUSTRIES, INC.

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Dealers in Principal Tool Centers of the U. S.

The Iron Age INTRODUCES

Gen. Benjamin W. Chidlaw, U. S. Air Force, named vice president, **Thompson Products, Inc.**, Cleveland.

Maximilian B. Bauer, elected a director and appointed vice-president, **Diesel Energy Corp.**, New York.

Alfred M. Blakesley, appointed sales manager, flush door department, **Atlas Plywood Corp.**, Boston.

P. E. Tobin, appointed general sales manager, truck division, **White Motor Co.**, Cleveland.

George M. Hieber, placed in charge of the development of electromechanical instruments, **Gulton Mfg. Corp.**, Metuchen, N. J. **Samuel Hanish**, will head its underwater sound division. **Bernard Mayer**, appointed field engineer in the New York and New Jersey metropolitan area.

Alan D. Kattelle, appointed assistant general purchasing agent, **American Brake Shoe Co.**

John Rivoire, appointed manager, Industrial Economics Div., **Midwest Research Institute**, Kansas City.

George Lenart, appointed assistant treasurer, accounting, budgeting and cost functions, **R. Hoe & Co., Inc.** **W. J. Robinson** will be in southern sales office in Birmingham.

Edwin F. Goldfuss, elected controller, **IBM World Trade Corp.**

William L. Kleitz, elected director, **American Smelting & Refining Co.**, New York.

Willard L. France, appointed general manager of Pacific Coast Works at Los Angeles, **A. O. Smith Corp.**

David L. Doty, appointed assistant to the director, technical services, **Jones & Laughlin Steel Corp.**, Pittsburgh.

Robert J. Longenecker, appointed to the sales staff, **Foote Mineral Co.**, Philadelphia.

James F. Albanese, promoted to manager of office services, **Wheeling Steel Corp.**

Clyde M. Williams, appointed general manager of **National Steel Products Co.**, Pittsburgh.

Howard J. Findley, appointed assistant director of engineering, **Eaton Mfg. Co.**, Cleveland.

R. L. Williams, named district manager of the new Columbus, O., office of **Timken Roller Bearing Co.**, Canton, O.; **B. C. Price**, manager of St. Thomas, Ontario, office; **L. H. Gegenheimer**, district manager of the Cleveland office.

John A. Jost, joined **Kewanee-Ross Corp.**, Buffalo, as heat exchanger development engineer.

J. Russell McGee, appointed manager of distributor sales, **Danly Machine Specialties, Inc.**, Chicago.



K. P. MARTIN, appointed vice-president in charge of sales, **National Automatic Tool Co., Inc.**



FREDERICK C. KROFT, named general superintendent of manufacturing, **Haynes Stellite Co.**, a division of **Union Carbide and Carbon Corp.**



ALFRED FLEISSIG, appointed general sales manager, **Loewy-Hydro-press Co., Inc.**



DAVID L. DOTY, named assistant to the director, **Technical Services**, for **Jones & Laughlin Steel Corp.**

PERSONNEL



Robert H. Kaltenhauser, John E. Mosser, Jr., and David L. Raymer, named research metallurgists at the Brackenridge, Pa., research laboratory of Allegheny Ludlum Steel Corp.

Arnold H. Miller, appointed consulting engineer and member of the board of directors, Compania Nacional Cubana de Minas, S. A.

H. E. Tracy, appointed manager, and D. F. Strang, product manager, of the new Mechanical Seal Product Div., Byron Jackson Co.

Fred C. Frame, appointed sales engineer, Salem-Brosius, Inc., Pittsburgh.

Arthur Townhill, joined Harvill Corp., Los Angeles, as director of engineering.

Ralph J. Eschborn, named chief engineer, Jack & Heintz, Inc.

John J. Brogan, appointed general sales manager, Cleveland Pneumatic Tool Co., Cleveland.

Charles F. Simmers, appointed vice-president in charge of engineering, Morgan Engineering Co., Alliance, O.

E. S. Russey and A. W. Rose, elected vice-presidents, Borg-Warner Corp., Chicago.

Max Schlossberg, elected chairman of the board, John B. Schlossberg, president, Paul Becker, executive vice-president, and Edward Superfine, vice-president, Max Schlossberg Co., Chicago.

Glenn F. Ihrig, appointed general sales manager, The Wellman Bronze & Aluminum Co., Cleveland.

Thomas Trowbridge, named assistant general sales manager, William J. Bennett, appointed sales manager of the eastern region, and Victor F. Perreault, appointed industrial trades manager, Behr-Manning Div., Norton Co.

JOHN A. GILROY, named plant engineer, Harnischfeger Corp., for the company's plants in Milwaukee.



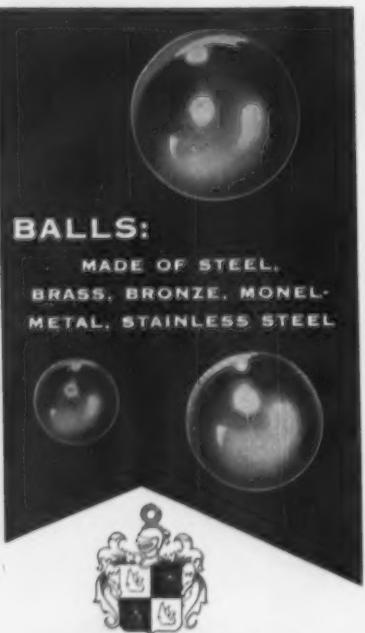
JOHN C. FERGUSON, appointed assistant to the president, Superior Steel Corp.



HOMER R. BROWN, named sales manager, Milwaukee steel service plant, Joseph T. Ryerson & Son, Inc.



MALCOLM ROBERTS, appointed sales manager for the Cleveland sales district, Leland-Gifford Co.

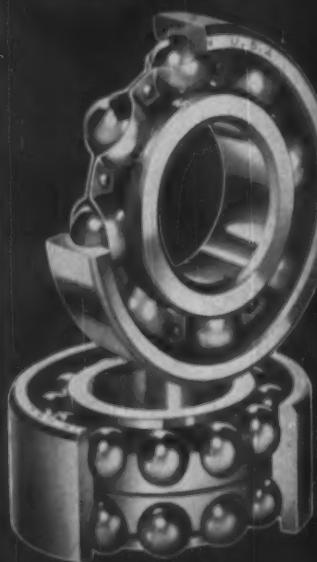


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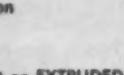
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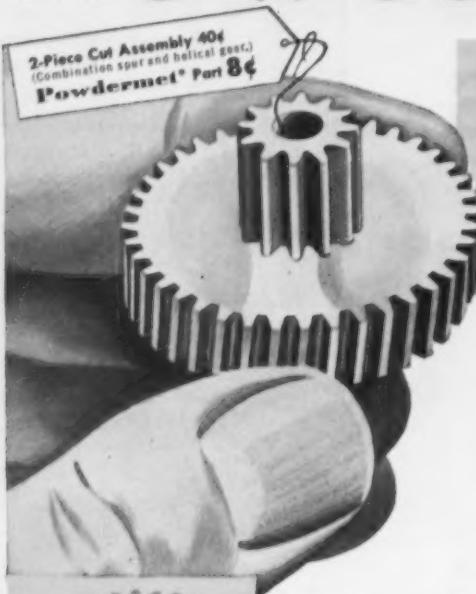
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Norbert K. Koebel, named manager of the Heat Treating Furnace Div., Lindberg Engineering Co., Chicago.

Irvin J. Paul, named assistant to the general superintendent, Earl D. Spangler, superintendent of tin mill division, and John E. Thompson, Jr., superintendent of the sheet mill division, U. S. Steel Corp.'s Gary sheet and tin mill.

Harry J. Higgins, appointed sales manager, Portland Copper & Tank Works, Inc., South Portland, Me.

Henry L. Pohndorf, elected vice-president in charge of sales, National Welding Equipment Co., San Francisco, William G. Norman, named chief engineer.

Stanley J. Mack, named manager of sales training, United States Steel Homes, Inc., housing subsidiary of U. S. Steel Corp.

Neil E. Kile, appointed plant manager, Clinton, Mass., plant, Colorado Fuel & Iron Corp.

Clifford R. Carson, named manager, process and methods department, Defense Operations Div., Chrysler Corp., Detroit.

R. Russell Fayles, named assistant to the manager of steel plants; Harry D. George, appointed superintendent of weld shop; and Warren E. Tobelmann, supervisor of Cleveland sales office, Lukens Steel Co., Coatesville, Pa.

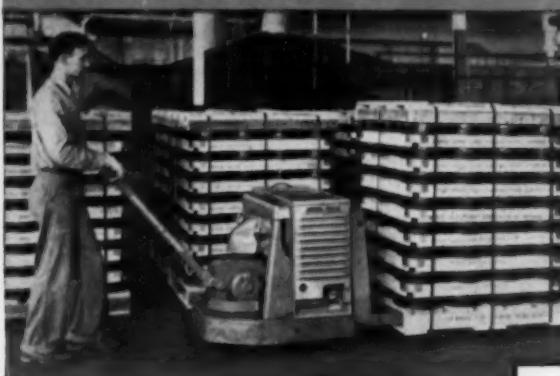
John F. Esping, joined the staff of railroad and aircraft department, Wyandotte Chemicals Corp., at the Kansas City district.

Murrin Held, appointed to the public relations department of Allegheny Ludlum Steel Corp., Pittsburgh.

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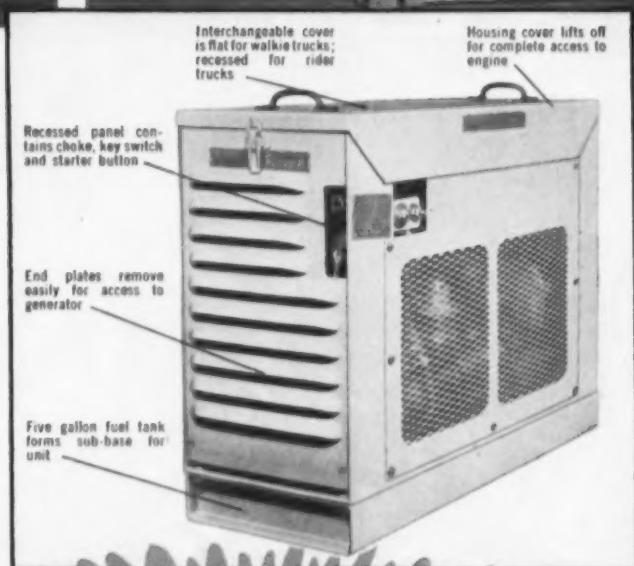
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Not many applications require the coating on TI-CO to take the punishment of repeated blows by the business end of a sledge hammer! We think this unusual demonstration does illustrate, however, the ability of TI-CO to take even the toughest fabricating operations . . . stamping, drawing, crimping, double-seaming, brake forming or even spin drawing . . . without cracking or flaking of the zinc coating.

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Close-up of TI-CO after sledge hammer test. Shows severity of strain on sheet and complete absence of cracking or flaking of the zinc coating.

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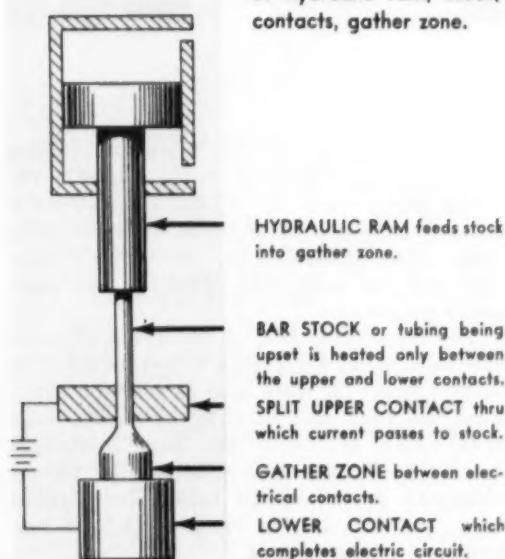
Opposite of extrusion—

Metal Gathering: What It Is and How It Works

- ♦ High strength metal parts with integral end sections are produced by "metal gathering" . . . This unusual process accumulates plastic metal under pressure at the ends or in the middle of tubing or bar stock.
- ♦ Increased strength, good grain flow, and uniform metallurgical properties are obtained . . . Complicated parts can be made without welding or mechanical assembly . . . Savings in handling, reduction in weight, elimination of machining are often possible.

By W. E. ACHOR, Chief Engineer, West Coast Div., Thompson Products, Inc., Bell, Calif.

FIG. 1—Diagram of process shows relationship of hydraulic ram, stock, contacts, gather zone.



♦ METAL GATHERING has been used to obtain a variety of advantages in the production of metal parts. This unusual process, the opposite of extrusion accumulates or gathers a length of metal stock into a short mass on one or both ends in an integral end shape. It has been used to make parts formerly assembled mechanically or by welding. In some cases it is used to eliminate machining.

In the process, Fig. 1, stock is heated by its own electrical resistance. A high amperage current is passed through the portion of the stock held between upper and lower electrical contacts. The "gather zone" is the gap between these contacts. By controlling the amount of current which passes through the stock in the gather zone, the temperature is held at plastic forging heat. The heated stock is progressively displaced under the force of a hydraulic ram. The ram continuously feeds additional stock into the gather zone where it in turn becomes a part of the electric circuit, heats to forging temperature, and is displaced into the gathered mass.

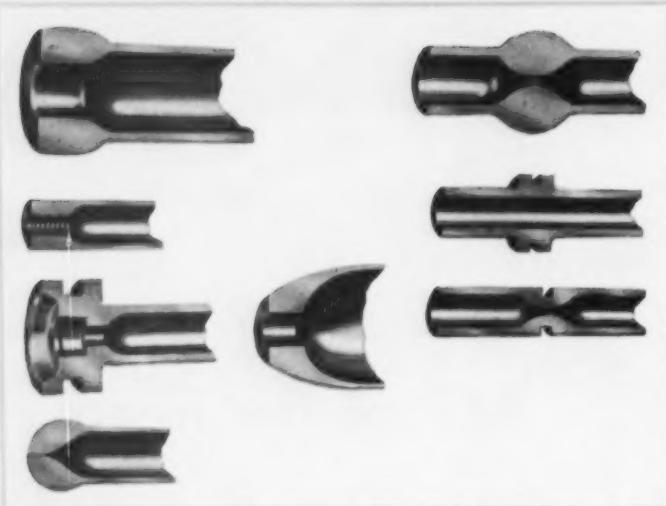


FIG. 2—Typical end and mid-point gathers. At top are parts in the as-gathered condition.

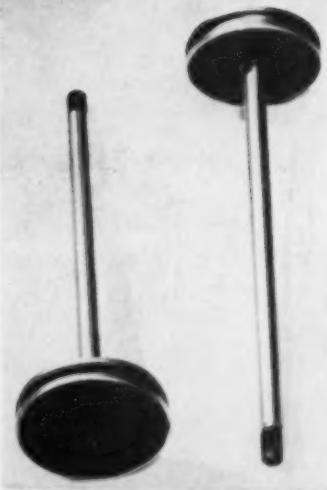


FIG. 3—Head of pneumatic piston, once machined and secured to rod with a nut, is now an integral piece. Using 0.750 in. 4130 bar stock, 12 in. of stock is gathered, forged, and machined.

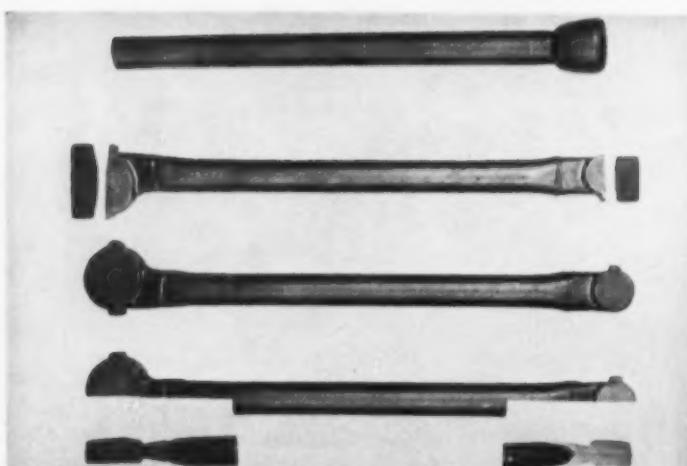


FIG. 4—Aircraft pivot arm forging produced by gathering 9 in. and 6 in. of 1 in. OD x 0.095 in. wall tubing and forging. Sections show how tightly tube hole is closed in forging.

"Upsetting," by comparison to "gathering" is the displacement of an unsupported length of material. The unsupported length to be upset is limited to $2.5 \times t$, where t equals the smallest thickness of stock. Upsetting a solid bar of $\frac{1}{2}$ in. diam, is limited to $2.5 \times \frac{1}{2}$ in. or $1\frac{1}{4}$ in. of bar length. Upsetting of tubing is even more restricted.

Metal gathering differs from upsetting in that the length of stock which can be accumulated in the gathered mass is theoretically unlimited. The length of stock which can be gathered is restricted only by the power, size, and hydraulic limitations of the equipment.

Two types of gathers are common: the end gather and the mid-point gather. These are

shown in Fig. 2. The two uppermost sections show parts as removed from the gathering machine. Other parts are typical applications of aircraft push-pull control rods, airframe structural tubes, hydraulic and pneumatic pistons, spherical end push rods, hydraulic and pneumatic piston rods.

The West Coast Div. of Thompson Products has been producing engine valves by the gathering process for more than 15 years on equipment designed and built by Thompson engineers. This equipment has been continually revised and improved to make possible the applications to thin-walled tubes. Gear blanks, bolts, and a variety of other parts have been produced by the process.

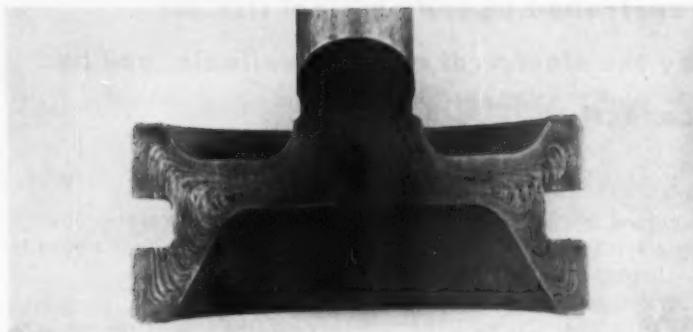
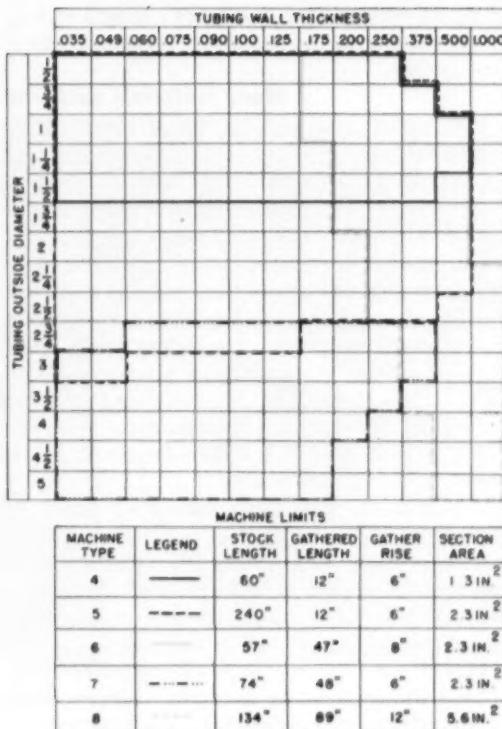


FIG. 6—Grain flow produced in part which has been gathered and then forged.



Metal Gathering Advantages

Some combination of these advantages will be found in all applications.

1. Permits lower cost of fabrication.
2. Provides integral ends as a unit with the longitudinal member.
3. Eliminates time spent handling and assembling separate parts.
4. Eliminates welding, brazing and mechanical fastening.
5. Reduces weight.
6. Increases overall strength and safety.
7. Provides good grain flow.
8. Assures uniform metallurgical properties.

Left: FIG. 5—Dimensional limits of tubing handled by various machines. Machines with hydraulic controls are shown in black. Those with chain controls are shown in color.

Frequent metal gathering makes it possible to make as one piece a unit originally made using mechanical or welded assemblies. A case in point is the pneumatic actuator piston, Fig. 3. The head was originally produced as a separate piece and assembled to the shaft with a nut. The part is now produced by gathering 12 in. of $\frac{3}{4}$ in. diam stock which is then forged, machined, ground and chrome plated to produce an integral piston from AISI 4130.

Production is starting on another integral end aircraft part to replace a welded assembly. The part will have a wall thickness of 0.035 in. for most of the tubular length, increasing to 0.095 in. near the end of the closed hole. Nine inches of 0.095 in. wall material is gathered and

drop forged to shape the large end of the pivot arm, Fig. 4.

The tube hole flattens shut, resulting in a flat pipe approximately $\frac{3}{4}$ in. wide extending from the hole to the end of the part. Completeness of the closure is illustrated in the section views, Fig. 4. Mounting holes are bored through the forged ends to provide pivot joints. The design permits equivalent strength with less weight as compared with the bulkier and more costly welded assembly.

Increased wall sections can be provided for stronger flashwelded areas. In other uses, such as the aircraft push-pull control rods, the ends can be made integral, avoiding the necessity for a flashwelded or assembled end.

"Dimensional limits are controlled by the physical size of the present equipment, by the electrical energy available, and by the hydraulic pressure capacity . . ."

A hydraulic piston, originally machined from solid bar stock, required machining stock from piston size down to shaft size plus boring the hole. This part is now produced by gathering 4 1/2 in. of heavy walled tubing 1 5/16 in. x 0.281 in. wall.

In some cases metal gathering permits a reduction in weight. In many assembled units, wall thickness of tube or "T" beam may be determined by the strength required at a mechanically attached end fitting where the cross-section is reduced by threads or rivets. It may be difficult or impractical to reduce the cross-section over the remaining length of the part so wall thicknesses calculated for the reduced cross-sections created by the joints is maintained throughout the length of the part.

A similar situation may develop for a welded end joint where the design cross-section required for strength reliability at the weld is retained for the full length of the part.

Handles bar 2 1/2 in. in diameter

Dimensional limits are controlled by the physical size of the present equipment, by the electrical energy available, and by the hydraulic pressure capacity. These limitations, however, are gradually being expanded to fulfill specific requirements as they occur in sufficient magnitude to justify revision of equipment.

Fig. 5 considers the limiting factors and shows the diameter and corresponding wall thickness limits which present machines will handle. Machine limits, Fig. 5, indicate:

1. The original stock length that can be accommodated by the specific equipment represented by the legend.

2. The gathered length which indicates the maximum length of material that can be introduced into the gathered mass.

3. The gather rise representing the maximum height of gather that the machine can accommodate. The "as gathered" height, however, is usually governed by the permissible ratios of material displacement.

4. The maximum cross-sectional area of the stock based on electrical power capacity. The smallest tube gathered in production was 5/16 in. OD x 0.035 in. wall and the largest was 5 in. OD x 0.125 in. wall.

The smallest diameter of round bar gathered on a production basis was 1/4 in. and the largest was 2 1/2 in. in diam.

Experimentally, rectangular stock 1/4 in. x 1 1/2 in. has been upset without difficulty and it appears practical to upset rectangular widths up

to 3 in. or 4 in. and wall thicknesses down to 1/8 in. or less on a production basis if a requirement arises.

Gathers have been made on a production basis up to 8 in. from the end of the stock for hydraulic pistons requiring a double end rod and for integral shaft gear blanks. This can be applied to tubing, bar or rectangular stock. The present equipment is limited to a length of 8 in. from the end of the stock to the nearest side of the gather.

Many materials gathered

Maximum mass that can be gathered on the end of a tube, bar or shaped member is determined by the cross-sectional area of the stock multiplied by the gathered length which can be accommodated by the equipment.

Extensive experience, either on a production basis or experimentally, has been gained with gathered materials. These include carbon steels, alloy steels, a variety of stainless steels, some special alloys, titanium and aluminum. Most material has been in the form of round solid bar or tubing. However, some rectangular stock and some special shapes (in the alloy steels) have been used experimentally.

Titanium (Ti-150A) gathered as easily as stainless steel. Although no effort was made in the experiments to shield the titanium from atmosphere, an inert gas curtain would be relatively simple to provide. Gathering of aluminum has been successful only in carefully controlled experiments and only with 14S material. Additional development is necessary before aluminum will be run successfully on a production basis.

Grain flow produced in a part as the result of the gathered and forged method of production is shown in Fig. 6.

A forging process at forging temperatures

Metal gathering is basically metal moving—a forging process accomplished at normal forging temperatures. The process provides metallurgical properties comparable to a forging relative to grain size, strength, heat treatment and similar considerations. No special attention is required in heat treatment of gathered parts. Since the material in the gathered end has the same chemical analysis as the rest of the member, it has a similar response to heat treatment.

ACKNOWLEDGMENT

We wish to thank Lockheed Aircraft Corp. for assistance to the metal gathering program and for permission to publish material used in this article.

A reliable fabricating method—

Pressure Welding Gives Stronger Titanium Joints

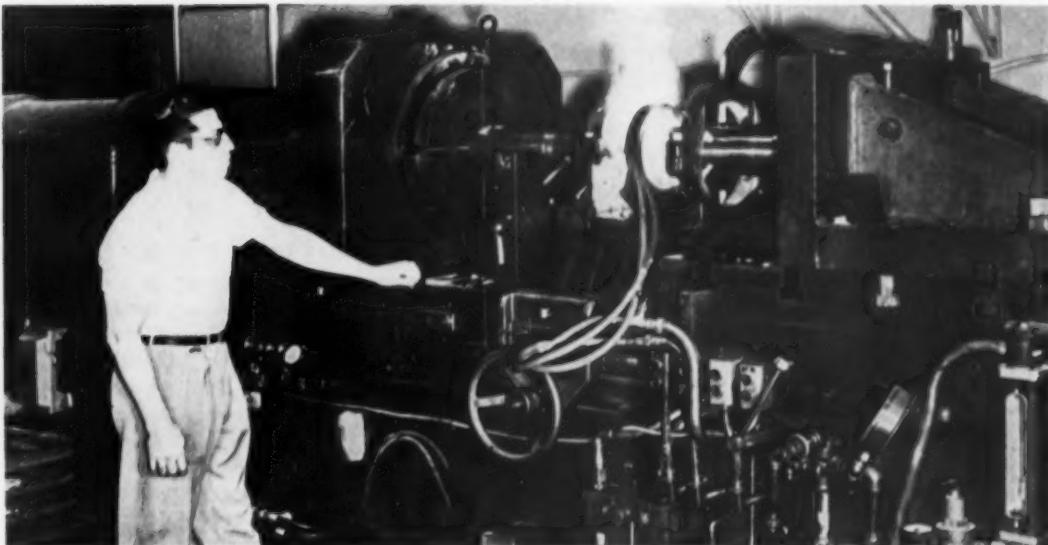


FIG. 1—Overall view of the 16-in. Uniweld machine used for pressure welding of titanium.

♦ Pressure welding provides a reliable method of fabricating 3Al-5Cr titanium alloy . . . The method produces a forged butt weld of superior strength by upsetting the faying surfaces under heat and pressure.

♦ Hot working during welding improves weld strength without changing the basic character of the alloy's grain structure . . . Success with the method has led to continued development of the process for other titanium alloys.

By A. P. LAGE, Senior Research Analyst,
and S. S. SMITH, Jr., Senior Research Analyst,
Menasco Mfg. Co., Burbank, Calif.

♦ HIGH STRENGTH titanium alloy tubing has been successfully pressure welded by Menasco Mfg. Co. of Burbank, Calif. Success with the 3 pct aluminum, 5 pct chromium alloy has led the company to undertake development of the technique for other titanium alloys. Tests indicate pressure welding offers a reliable method of fabricating the titanium alloys.

Pressure welding has been used extensively at Menasco to join tubular sections for aircraft landing gear. Uniweld joint efficiency in alloy steels is equivalent to parent metal strength in diameters from $1\frac{1}{4}$ to $15\frac{1}{2}$ in. in OD, cross-sectional areas from 1 to 60 sq in., and at heat treat levels from 90,000 to 280,000 psi ultimate tensile strength. Welded components have been used in

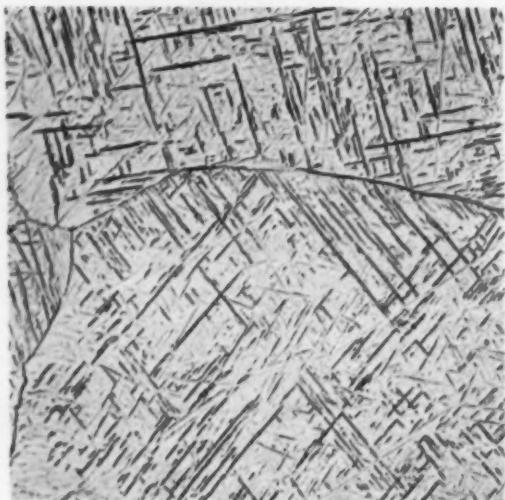
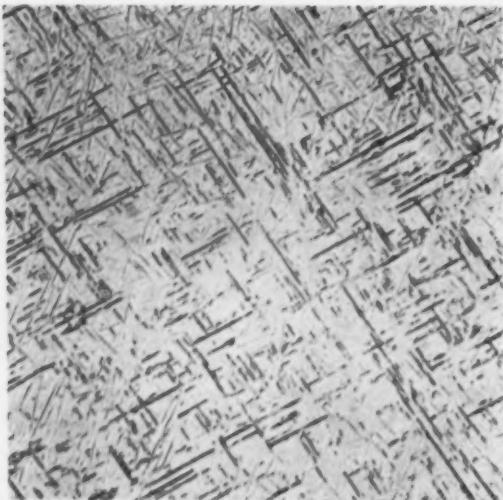


FIG. 2—Basic microstructure of pressure-welded titanium remains unchanged although some grain refinement in weld zone is noted. Base metal is at left and weld zone at right. 500X

tension, compression, bending, torsion, and as high pressure vessels.

The process produces a forged butt weld by upsetting the faying surfaces under heat and pressure. Heat is supplied by oxyacetylene flames, Fig. 1, arranged on the inside diameter of a ring torch. To minimize localized overheating, the torch oscillates radially around the joint during welding. Pressure, supplied by hydraulic rams, is applied before lighting the torch and remains constant throughout the weld.

Shutoff automatic

At the end of the cycle, the oxyacetylene flame and welding pressure are automatically shut off by microswitches actuated when the desired degree of upset has been obtained. Welds are then machined on outside and inside diameters to remove superficial defects such as overheated metal at the point of flame impingement and inside diameter fissures. This is followed by heat treating to the desired strength level, proofloading, and final machining.

The materials most extensively pressure welded at Menasco are alloy steels of the 4100 and 4300 series. Recently, experimental work has been successfully completed on both Inconel X and the high strength titanium alloy containing 3 pct aluminum—5 pct chromium. A comparison of fusion, flash, and pressure welding methods, applied to this titanium alloy, indicates pressure welding assures greater consistency, strength, and ductility in welds.

Tubular sections of the titanium alloy were obtained for welding by turning and boring bar

stock to 3 in. outer diameter by $\frac{3}{8}$ in. wall.

Due to low thermal conductivity of the titanium alloy, and the differences between the high temperature properties of titanium and steel, considerable departure from standard welding procedure was required. Usual weld joint preparation for steel consists of chamfering the faying surfaces of both the inside and outside diameters of butting tubes. With the titanium alloy, much better weld configurations were obtained by eliminating the chamfer from the inside diameter and increasing that on the outside diameter by a corresponding amount. This allowed the metal at the inside to reach the necessary temperature during welding for it to upset properly without excessive heating and deformation on the outside diameter.

Properties obtained in the weld zone compare with those of the base metal as shown in Table I, indicate no loss of tensile strength in the weld zone but a marked reduction in ductility. Subsequent development work proved this loss of ductility to be due solely to the temperature reached during welding; no heat treatment could be found which would restore this.

Shortly after this development had been completed, a low-carbon arc-melted version of this alloy became available. This reduction of carbon content eliminated the free carbide phase and made it possible to improve the ductility of the weld zone. Pressure welds made with this low-carbon grade were found to have excellent properties as shown in Table II.

The increased tensile strength coupled with a

slight reduction in ductility appears to be characteristic of an increased degree of forging about 1600°F. It is believed the improvement in strength reflects the hot work introduced during welding and that only minor phase changes have occurred. Photomicrographs, Fig. 2 (right), indicate some grain refinement in the weld zone but the basic microstructure appears unchanged.

Figure 3 compares a macrosection through a weld with one through a weld tensile specimen tested to failure. The tensile fracture, while occurring in the weld zone, did not take place in the weld plane itself. Of 18 weld tensile specimens tested, 14 failed as shown while 4 failed outside the weld zone. No defects were detected in any of the tensile test bars and the small variation in the test results (less than plus or minus

2 pct of the tensile strength) shows the reliability and reproducibility of the process.

Menasco plans to apply the pressure welding technique to other titanium alloys, including high strength forging alloys, as they become commercially available. Two such alloys are now being studied, namely the 3 pct manganese complex, and the 6 pct aluminum—4 pct vanadium. These are both considered heat treatable and it is expected the properties obtained in pressure-weld assembly will exceed those now obtained in the 3 pct aluminum—5 pct chromium alloy.

ACKNOWLEDGMENT

The authors are indebted to the Bureau of Aeronautics for their support in this program and for permission to publish this article.

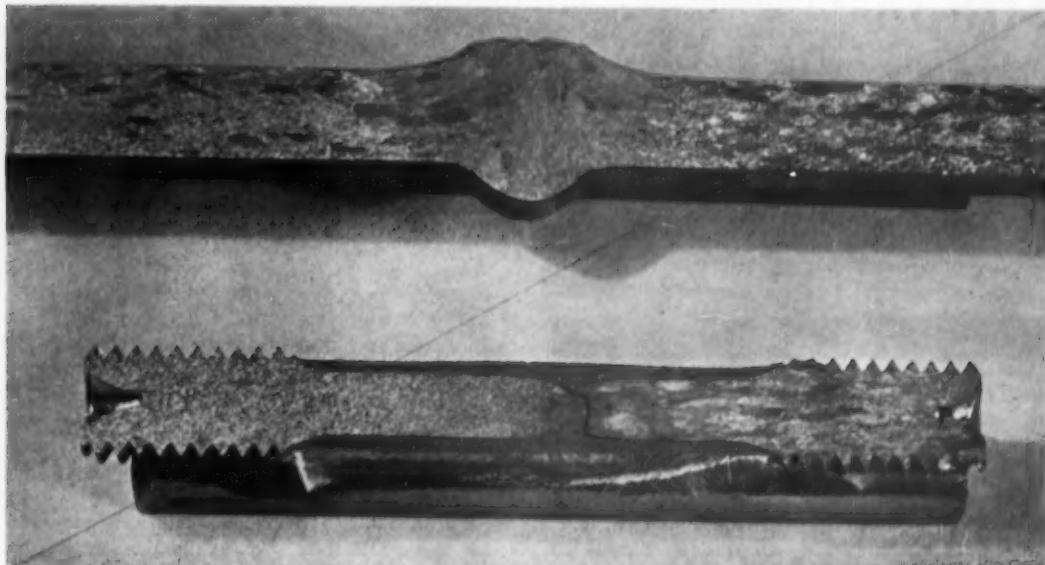


FIG. 3—Comparison of macrosections through weld zone and through weld tensile test specimen.

PRESSURE WELDED TITANIUM

TABLE I
Standard 3 Al-5 Cr Titanium Alloy

	Tensile Strength, psi	Yield Strength, psi	Elongation, Pct in 4D	Reduction of Area, Pct
Base metal	157,000	145,000	7	17
Weld zone	159,000	157,000	2	—

Low Carbon, Arc-Melted 3 Al-5 Cr Titanium

TABLE II

	159,000	147,000	16	40
Base metal	167,000	160,000	13	35

Research takes another step—

- Speeded-up production programs have placed a burden—and some knotty problems—on metal finishing departments and shops . . . New plating machines, materials, processes and instruments not only help the metal finisher to keep pace with them, but often to stay ahead.

Metal Finishing: New Developments Shape Future Trends

- New compact and highly versatile plating machines have high plating capacity, produce uniform finishes and can be used for anodizing or immersion coating . . . Instruments recently developed give platers inexpensive means for turning out quality and specification plate . . . Improved chemical compounds broaden the ranges for good control.

By J. J. OBRZUT, Metal Finishing Editor

• HEAVY DEMANDS on metal finishers have been—and continue to be—for greater output at lower cost and better quality. Suppliers to the trade are not only keeping pace with these demands, but in many cases staying ahead of them. They are providing for metal finishing shops—big and small—new machines, controls, power supply equipment, instrumentation and all the other things which help to do a job faster, more accurately and with less effort.

This was the general tone around Cleveland's Public Auditorium where the American Electroplaters' Society ran its Forty-Second Annual Convention from June 20 to 23. Under the same roof, the society staged its Fourth Industrial Finishing Exposition in which more than 125 exhibitors took part. It gave visitors a chance to see firsthand how machines operate, what materials will do, how instruments can give them simpler control and how new techniques will help turn out better plated products.

Several plating machines were shown publicly for the first time. One of these was Udylite's fully automatic barrel plating machine which, in addition to its high output, incorporates a great deal of flexibility. Delayed set-down and

skip mechanisms permit any barrel at any station to be raised or lowered independently. The machine can be preset to any plating cycle but all barrels need not follow the same cycle.

Another machine, designed primarily to give small shops plating versatility, is Hanson-Van Winkle-Munning's Skip-Stop Conveyor. It is a relatively low-cost machine capable of handling barrels, baskets or racks in any combination, and with maximum flexibility. In addition, it can do cell plating. It can be adapted to many different setups, including existing tank arrangements. In spite of its great flexibility, one man can operate the machine.

Small machine has high output

Frederic B. Stevens, Inc., introduced an automatic plater which fits the needs of small and large shops alike. Called "Little Steve," this machine was designed essentially for plating small and medium-size parts such as electrical parts, plumbing fixtures, door hardware, small appliances and similar items. It's equally efficient for applying anodized and immersion coatings. It has high production capacity, yet it occupies only 7 by 10 or more feet of floor space. In

in many cases, it can be set up without disrupting an existing layout.

Jobbing platers saw what the "Do-It-Yourself" trend can do for them. With only a wrench, screwdriver and an Erect-A-Rack kit, racks can be made up quickly for virtually any plating job. Using preformed parts, a plater need only to slide the desired contacts on a spine, space them, then tighten. There's no drilling necessary. With an assortment of parts on hand, platers can cut preparation time on rush jobs to a minimum.

Several new instruments which made their debut are a far cry from the "rule-of-thumb" days. One of these, called the Dermitron, is a nondestructive thickness tester. It is based on a principle developed at the Bureau of Standards. With it, virtually any coating on any base can be checked quickly, accurately and directly by simply placing a probe on the coating surface and reading the thickness on a calibrated scale. It can be used for combinations such as silver on brass, copper on zinc, metallized coatings on plastic, anodized coatings on aluminum, plated deposits on ceramics and many other dissimilar combinations.

New instrument saves water

Another instrument takes the guesswork out of the amount of water to use in rinse tanks. Known as the Solu Bridge, it is a simple electronic device which continuously measures the degree of conductivity in a solution by means of a probe and a controller. Once the minimum desired concentration of chemical in a rinse tank is determined, the instrument is set to the desired control point. It then permanently maintains that concentration. It also shows the exact amount of dragout between tanks. With this instrument, water savings are substantial.

Still another instrument, also of the probe type, is a pocket-sized pH meter. This, too, is simple to operate. By immersing the probe in the solution to be tested, the meter gives a direct reading within ± 0.1 pH on a scale calibrated from 2 to 12 pH. One-knob control further simplifies its operation. Using hearing-aid type batteries, the instrument is small so that it can be strapped around the neck or over the shoulder, leaving both hands free.

A number of new coatings were among the highlights of the show. The copper-tin alloys introduced by Metal & Thermit Corp. and Battelle Development Corp. are bound to find broad fields of usefulness. These alloys have some excellent properties, some of which may give the answers to many difficult finishing problems.

These bronze alloys may be deposited either from still tanks or barrels. They have exceptional throwing power, giving good coverage in recessed areas. They also have good color appeal, resembling that of gold. If desired, they may be flashed with brass or easily buffed. Used under brass, they can replace nickel.

In hardness, bronze plate approaches that of

nickel. If bronze is substituted for copper in a copper-chromium system, or a copper-nickel-chromium system, the coating is said to have superior corrosion resistance.

Tin-nickel alloy plate is another which holds great promise for platers. A 65-pct Sn-35 pct Ni alloy deposited to a thickness of 0.001 in. or more has exceptional resistance to corrosion. In thicknesses less than that, its corrosion resistance is at least equivalent to that of the same thickness of a copper-nickel combination. Because these alloys resist tarnishing, they should find many uses in the decorative field. They are readily solderable, quite hard and fairly ductile.

Good leveling with bright nickel

Harshaw Chemical Co. came up with two new bright nickel processes. Both, Perglow and Nubrite, are said to provide exceptional brightness, good ductility, excellent leveling action, and accept a chrome plate readily. Both baths are easy to control and have high tolerance to impurities.

In the cleaning field, Wyandotte Chemicals Corp. developed a new compound for electro-cleaning nonferrous parts in automatic or hand-operated lines. Called Lectrite-NF, it is particularly suitable for brass, but it also performs exceptionally well on copper, copper alloys, zinc diecastings and a number of other alloys. It is inhibited to prevent staining, etching, excessive oxidation, or clouding of plate. Its detergency and soil tolerance are high.

Ultrasonic cleaning was exhibited by several firms, but a new wrinkle was the use of ultrasonic equipment to speed plating. By ultrasonic irradiation of the plating bath, the General Ultrasonic Co. showed how the plating cycle could be reduced to a fraction of the time normally required. Although this method is not universally applicable, there are applications where the process can be used to good advantage. The same principle was demonstrated on a small scale in acid pickling and descaling operations, and in various cleaning solutions.

Zinc phosphate forms tight bond

In the zinc phosphating field, a new series of compounds are claimed to have advantages not found in other zinc phosphate coatings. Developed by Cowles Chemical Co., the coatings form a chemical bond to the metal and become an integral part of it. The coatings are hard and dense, and will not crack or flake off even during severe flexing or bending. They are non-crystalline in structure. The bath, which can be operated over a temperature range of 160° to 210°F, is nonsudging.

Hot spraying of paints has many advantages, but a new Spee-Flo hot spray unit adds a few more. It is small, compact and simple to operate, yet it is efficient, economical and produces quality finishes. This circulating type heater attains full heat in about 3 min and then maintains that heat automatically.

Get rid of trouble spots—

Coatings: Good Structural Design Aids Battle Against Corrosion

- ♦ Angles, corners, welds, rivets and edges are major trouble spots when it comes to coating steel structures . . . Regardless of coating material quality or precautions taken in surface preparation, good structural design is a must for effective corrosion protection.
- ♦ Sharp edges and corners are potential focal points of corrosion . . . Rivet heads, weld spatter and rough welds, lapped joints and built-up trusses are other sources of trouble . . . Good coating practice can minimize these difficulties and greatly prolong a structure's service life.

By C. G. MUNGER, Vice President of Research and Manufacturing, Amercoat Corp., Los Angeles

♦ DEVELOPMENT of coating materials with exceptionally good properties is helping users in their battle against corrosion. In applying them, they stress proper surface preparation and surface specifications and set down detailed procedures of application. They continually study and evaluate their properties. All these measures are taken to acquire maximum protection in corrosive atmospheres. But they sometimes overlook one of the most important areas of corrosion control practice—structural design.

Actually, the service life of a coating is closely linked to structural design. It is not too difficult to protect a smooth, flat surface to which a suitable coating can be applied in a continuous film of proper thickness. However, the coating problem becomes complex when the structure involves a variety of angles, corners, welds, rivets and edges, regardless of the material's quality.

Some examples of typical corrosion reactions help to emphasize the points in design for corrosion protection. The corrosion of iron in pure water demonstrates the mechanism of iron going into solution as a positive ion and leaving

negative electrons within the iron itself which are then dissipated by neutralizing hydrogen ions from the water. This mechanism is illustrated in Fig. 1.

Under actual conditions, this reaction is not nearly so simple. The example in Fig. 2 shows the chemical action which probably takes place under a rust tubercle in water or sea water. As iron ions go into solution, they tend to react with the OH ions in the vicinity and form a tubercle of ferrous hydroxide.

Coatings must resist acids

In the same vicinity and at the same time, there are an equal number of sodium, hydrogen and chlorine ions. One combination of these would form ferric chloride which is an acid salt and very corrosive. As the soluble iron salts are removed from solution by reaction with the hydroxyl ions to form the insoluble ferrous and ferric hydroxides, the hydroxyl ions are also removed from the area. This leaves an excess of hydrogen ions in the local area and creates an acidic condition.

According to Speller, when a tubercle of rust forms with a dense outer envelope of ferric

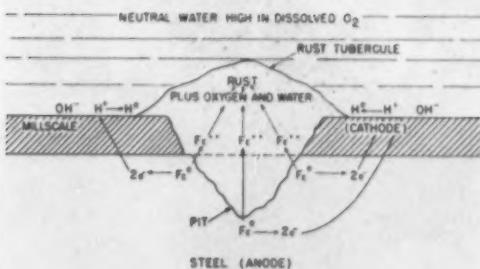


FIG. 1—Illustration shows mechanism by which water reacts on iron to establish corrosion.

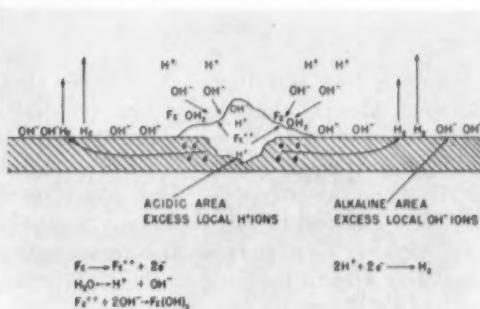


FIG. 2—In actual practice, this is the chemical reaction which probably takes place under a rust tubercle in pure water or sea water.

hydroxide, the inner anodic portion undergoing corrosion may become decidedly acid. The soluble portion of such rust tubercles has a pH of about 6 with a pH of 8 in the water outside. As the products of corrosion gather over the mouth of a pit, the metal at the bottom of the pit becomes more anodic so that the rate of penetration increases as the pit penetrates deeper into the metal.

The negative electrons move away from the area where iron goes into solution to another local spot where they react with the positive hydrogen ions. Again, all of the ions are present in this area. However, as the hydrogen ions are removed by the formation of hydrogen molecules, excess OH ions remain in the area forming a strongly alkaline condition.

Where continuous immersion in water or sea water is a factor, or where industrial structures may be subject to continual moisture, coatings must have a high degree of chemical resistance. They must resist acids to maintain adhesion and prevent undercutting in anodic areas. They must also be strongly resistant to alkalies to get away from blistering and actual solution by the strong caustic formed in the cathodic area.

Another classic type is crevice corrosion of which there are two forms. One is an oxygen concentration cell, shown in Fig. 3. This is an area of the surface outside the crevice where dissolved oxygen rapidly removes hydrogen atoms and creates a cathode, leaving the area in the crevice with a low oxygen concentration and, therefore, the anode.

The second form of crevice corrosion, shown in Fig. 4, is a metal ion concentration cell where a greater concentration of metal ions is in the crevice with a lower concentration of the same metal just outside the crevice. This creates an anode at the crevice mouth due to the equilibrium of the metal ions with the metal back in the crevice area.

These are some of the best known instances of where and how corrosion takes place. They are basic types which must be taken into consideration whether protecting old structures or designing new ones.

Protect existing structures

Where corrosive conditions exist, good structural design will deter corrosion. It is important not only to recognize a design deficiency, but to eliminate it wherever possible. Existing structures must be protected despite their design limitations. When corrosion danger points are singled out, steps can often be taken to substantially reduce their vulnerability to corrosion. In new design, an awareness of these

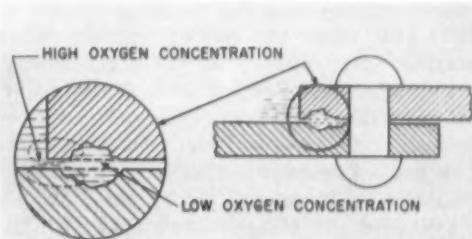


FIG. 3—One form of crevice corrosion is the oxygen concentration cell shown here.

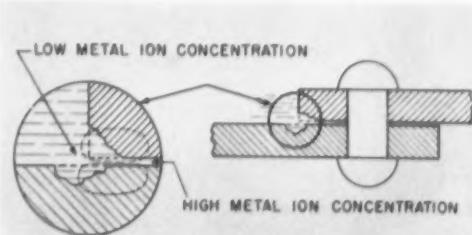


FIG. 4—Another form of crevice corrosion is this metal ion concentration cell.

"Structural steel with its variety of shapes presents the most common coating problems . . ."

weaknesses may often lead to minor changes which will reduce maintenance costs throughout the life of the structure.

Structural steel with its variety of shapes presents the most common coating problems. The outside of a piece of angle is difficult to coat properly because the coatings tend to pull away from sharp edges, establishing anodic areas or points of corrosion. The interior of the angle accumulates dirt and is a difficult area to reach by spray or brush. The high tensile strength plastic coatings, on drying, tend to bridge the inside angle, creating an air space between the coating and metal.

Proper coating techniques can do much to alleviate these negative factors. Spray patterns should be pointed directly toward the edge of an angle to build an adequate protective layer.

Enough coating material should also be sprayed directly into the interior of the angle for proper protection.

Eliminate sharp edges

Sharp edges or square-cut steel should be eliminated wherever possible. If the coating is applied by brush, and the brushing motion is away from the edge, the coating is invariably brushed off, leaving a thin area. A thin coating in an area which is particularly vulnerable to corrosion will lead to trouble.

Good practice calls for brushing toward an edge. This drags the coating over it. When spraying, spray directly at the edge. Double-coat all edges wherever possible. These points are important because condensed moisture tends to accumulate and run toward the edge of an angle, I beam or similar structure. Chemical dusts or fumes settling on the structure will dissolve and also accumulate at the edge, and accelerate corrosion.

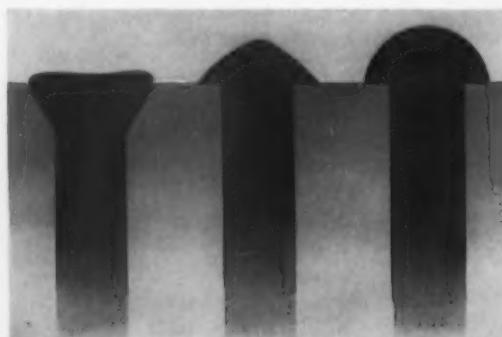


FIG. 5—Rivet heads are potential trouble spots since they disrupt coating continuity.

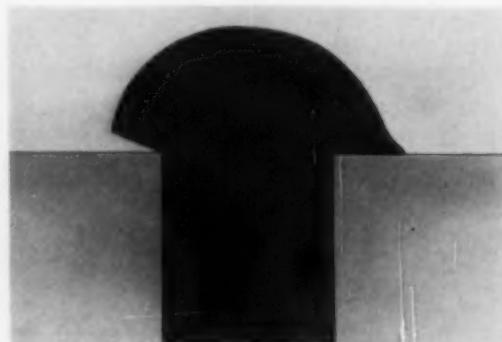


FIG. 6—Crevices under rivet heads, being difficult to coat, are corrosion focal points.

Rivets in steel structures are corrosion trouble spots because they disrupt the continuity of the coating. Fig. 5 shows the three rivet head shapes most commonly used—rounded, pointed and countersunk. The countersunk rivet is the easiest to coat because it is usually level with the steel surface. This leaves only a small line around the edge of the rivet which the coating can easily fill.

Rounded rivet heads generally cause less difficulty than pointed ones because their projections are less severe. However, with either type, there is always the danger of a rivet being cocked, leaving a crevice under one side as shown in Fig. 6. Such crevices are always corrosion focal points because they are difficult to coat.

Caulk rivets tightly

To overcome this structural handicap, all rivets in corrosive areas should be caulked tightly. Caulking should also apply to joints between steel plates. Unless tightly caulked, overlapping plates will create a crevice area where air, moisture, and chemical corrosives can accumulate and prevent proper protection by a coating.

Welding is widely used to fabricate processing equipment, steel tanks and many other structures. While welded joints are preferable to bolted or riveted joints from a corrosion design standpoint, they also present a source of coating difficulty. Weld spatter, such as that visible in Fig. 7, is a major source of difficulty where coatings are concerned. These small adherent particles of metal provide surface points from which coatings will flow away. This results in numerous thin areas along a weld making early coating failure certain. This condition can be remedied by carefully removing all weld spatter before coating.

Rough welds present an additional source of difficulty. Such welds should always be ground smooth before coating. Many times, too, weld



FIG. 7—Weld spatter and rough beads leave thinly coated spots, causing early failure.

flux is left on a weld. Because it is an alkaline hydroscopic material that absorbs moisture and induces early coating failure, it should be removed prior to coating.

Wherever a structure is to be placed in a corrosive area, skip welding should be avoided. It is impossible to properly coat a skip-welded surface because of the pronounced crevices involved. A continuous weld offers a much more suitable surface for proper coating.

Lap welding, often used in tank design, should also be avoided. The steel plates are frequently welded continuously on the outside only, leaving the plates overlapped on the inside. This provides crevices into which moisture and corrosive gases or liquids can easily penetrate. It is impossible to properly coat such joints. The only sure procedure is to continuously weld the joints, even on old equipment, if a coating is to give proper protection.

In steel-truss buildings, it is common practice to construct the trusses from angles placed back to back as Fig. 8 shows. Generally, the angles are separated by washers, creating areas that are difficult to coat and protect. Corrosive fumes penetrate these areas causing severe corrosion damage.

In new design, where such fumes are to be present, trusses should be designed with a minimum of crevices between steel members. Whenever possible, the member should be precoated before fabrication. For existing trusses in fume areas, the most practical coating procedure is to apply a bead of mastic on each side of the crevice and cover it with protective coating.

It would appear that piping in other cylindrical objects of reasonably large diameter would provide ideal surfaces for coating. This is generally true since there are no sharp edges and no crevices. Moreover, a cylindrical-shaped structural member presents less exposed surface area than flat-shaped objects.

In many instances where corrosion is a problem, piping is a superior substitute for I beams or H beams, if a cylindrical cross-section is

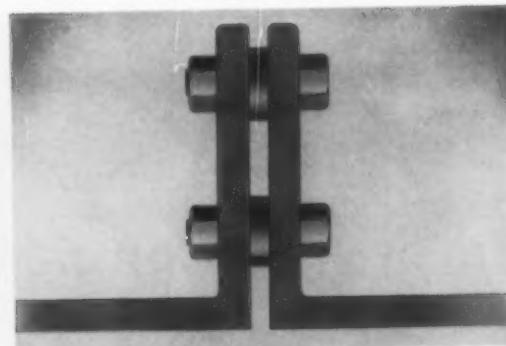


FIG. 8—Built-up trusses are difficult to coat, leaving areas without adequate protection.

permissible. However, extra care is required wherever pipe is to be coated.

Usually, coatings are applied longitudinally on piping. Because it is cylindrical, overlapping is difficult to achieve on the pipe's surface. Field experience shows that coating failure on pipe usually occurs in longitudinal patterns. This condition is easily remedied by coating pipe from at least 4 to 6 different positions.

When spraying pipe, passes should be made from angles involving about one sixth of the circumference. This procedure will assure overlapping of the coating and minimize possibility of early failure.

Problems in coating pipe

Another problem encountered in coating pipe is that of flanges, threaded joints and hangers. These usually serve as corrosion focal points because of the difficulty in coating them. They also involve crevices and sharp angles where moisture and corrosive elements can establish an early foothold. Such areas should be coated with extreme care to build an adequate film thickness.

While much has been done to develop good protective coatings, additional attention should be given to overcoming such structural handicaps. This extra care will prolong the life of the structure considerably. Where corrosion is a problem, it should be considered as important an engineering problem as snow loads, wind loads, or earthquakes. In coating existing structures, corrosion focal points should be given extra care to minimize the potential failure areas they represent.

By eliminating edges, corners, crevices, rough welds and other trouble spots, substantial savings will be achieved in the long run. Similarly, careful coating of such areas on existing structures will lengthen the cycle between coating and recoating so that the extra initial cost will be more than offset within a short time.

Oxygen

Improves Competitive Position of Older Openhearth

- ♦ Both steel quality and steel operations have been improved at Inland's Indiana Harbor Works since the company began using oxygen in its No. 2 openhearth shop . . . More important, experience shows the competitive position of the older openhearth has been considerably improved.
- ♦ Oxygen consumption in 1954 was close to 1.2 billion cu ft . . . Much improved fuel input, greater flexibility in scrap used, faster meltdown, few long soaking periods are some of the advantages gained.

By G. C. LAWTON, Superintendent, No. 2 Openhearth Shop, Inland Steel Co., Indiana Harbor, Ind.

♦ OXYGEN has been successfully used by Inland Steel Co. to improve the competitive position of its older openhearts. Quality of steels has been improved and production rates have been substantially bettered by using oxygen to aid combustion and speed decarbonization.

Installation of the oxygen system, engineered by Inland and Linde Air Products Co., was completed in March 1953. Consumption of oxygen in 1954, for both lance and burners, reached nearly 1.2 billion cu ft in Inland's No. 2 openhearth shop. Both metallurgical (95.0 pct) and high purity (99.5 pct) oxygen are delivered via two 8 in. underground mains from Linde's producing plant in East Chicago, Ind., to Inland's Indiana Harbor Works.

Prime advantages in the use of combustion oxygen has been the increase in fuel input which it has made possible. Forced air fans in No. 2 openhearth deliver a maximum air flow of 900,000 cu ft per hour. Before using oxygen peak fuel input was 60,000,000 Btu per hour. With oxygen, total fuel input has been increased to 90,000,000 Btu per hour. Several improvements in practice have resulted.

A greater percentage of bulky and undesirable types of scrap can be charged without interrupt-

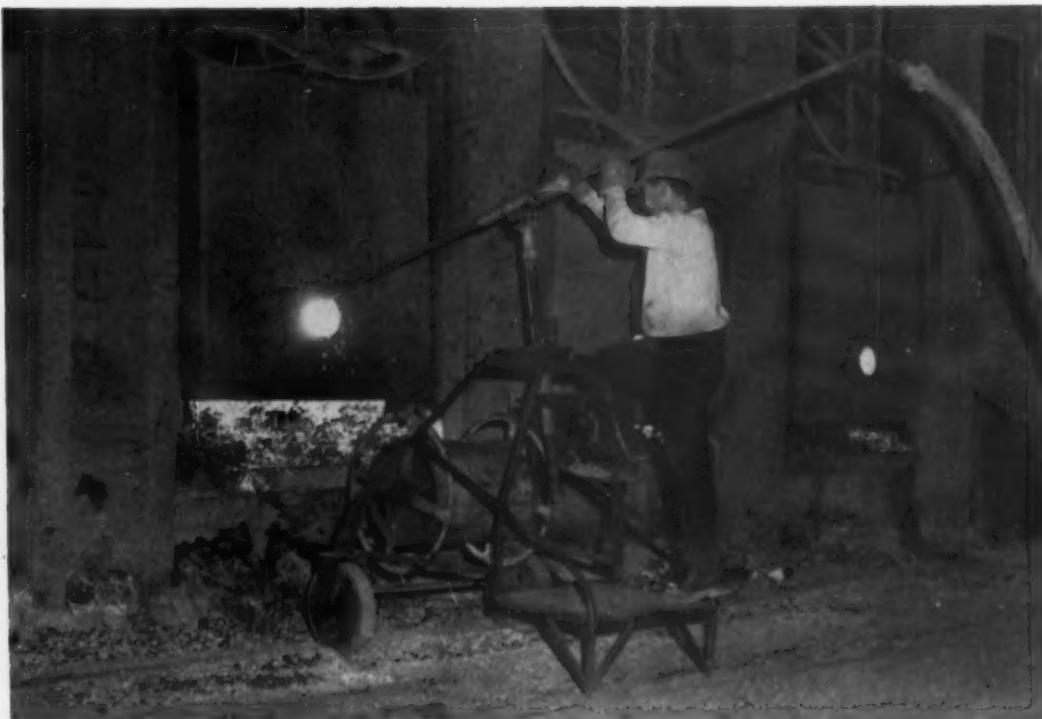
ing the operation to melt down sufficiently to add the balance of the scrap. This was a serious problem after the installation of a baler when the percentage of bundles in the charge was increased. This increase in fuel input and higher flame temperature permits a more flexible scrap purchasing policy especially during a tight scrap market.

Consumption of oxygen for combustion during the scrap meltdown averages 350 to 400 cfm. After hot metal addition the flow is reduced to an average of 150 to 200 cfm where usage is necessary. Use of some combustion oxygen after the hot metal addition has been helpful in maintaining normal heat time and tons per hour near the end of extended furnace campaigns.

Maximum furnace temperatures are now reached more quickly after the fettling period, because of the higher Btu input rates and the increased flame temperature possible with oxygen.

Faster meltdown of scrap has resulted in less sulphur absorption from furnace fuels. This has been an important factor in helping to meet the quality demands of the present highly competitive market.

Oxygen has permitted faster oreing and refining of a heat, resulting in faster rate of carbon drop thus speeding up the entire heat cycle.



CART used to carry special oxygen hose has pipe holder to ease the job of getting the pipe into the

steel bath. Hose connects lance pipe to oxygen box outlet in the openhearth shop.

Higher firing rates made possible by the use of oxygen have materially reduced delay time for bottom and bank repairs by faster sintering of the bottom materials.

Use of combustion oxygen has insured complete combustion of fuels within the relatively short combustion chamber. This more perfect combustion has reduced the amount of deposition in the checkers and flues which has been helpful in maintaining good production with good fuel economy throughout the entire campaign of the furnace.

Promotes limestone solution

Poorly shaped slags and phosphorus reversions have always been a problem on high carbon heats. Use of direct immersion lance oxygen has materially reduced the seriousness of this problem by promoting early solution of limestone, thereby providing an effective fluid slag at high carbon levels.

Time required to drain steel from a hole in the bottom or bank has been reduced to a minimum by using the oxygen lance to cut a trench from the hole to the tap hole. On large holes, oxygen from two hoses may be used, one to blow out the hole and the other to keep the steel fluid and running out the tapping hole. This method

of draining holes has had an appreciable effect on the morale of the furnace crews, because less physical effort is needed.

The exothermic reaction from the use of lance oxygen permits:

(1) Additions of ore at low carbons without fear of reducing metal temperatures which might result in bad pours and skulls.

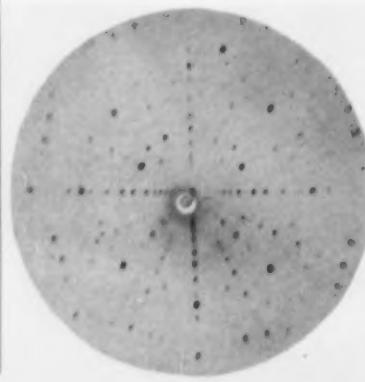
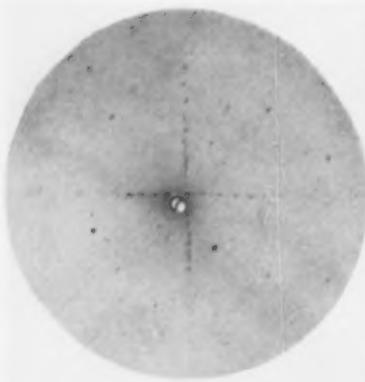
(2) Promotes a fluid, effective slag early in the refining period, resulting in lower ladle sulphurs.

(3) Provides a method of fast temperature pickup for heats that have insufficient temperature to be tapped, yet are close to the tapping carbon range.

(4) Permits rapid decarbonization with furnace fuel off, resulting in savings of fuel.

Rapid carbon drop from the use of lance oxygen, particularly in the low carbon ranges where slags are hot and thin, has minimized the need for long soaking periods which result in hearth erosion and forced taps.

An adequate supply of oxygen with sufficient pressure has permitted use of lancing equipment for cutting metal spills (and breakouts) into pieces which can be handled quickly and safely. The oxygen lance has reduced the time to prepare old bottoms for resurfacing.



LATE pattern of silicon single crystal developed in 4 minutes with new rotating anode tube, right; compared with stationary anode tube, left.

Below: NEW crystallographic X-ray machine is much faster, more powerful than comparable apparatus.

New X-ray Machine Speeds Metals Research



• AN EXCEPTIONALLY FAST, powerful and versatile new "crystallographic" x-ray machine is especially designed to study the atomic structure of metals and alloys at new ranges of high and low temperatures.

While other x-ray units will do the same basic job of fundamental research, they take much longer to come up with the answers. The power, speed and flexibility of this new machine collapses months of normal x-ray work into a few days or weeks.

Uses improved x-ray tube

Its use at the Westinghouse Research Laboratories was recently announced. The machine was designed by Dr. Abraham Taylor, a research scientist in the magnetic and solid state physics department.

Heart of the new apparatus is an improved type of crystallographic x-ray tube. It yields a narrow, intense x-ray beam, and directs this beam through the crystalline material being examined. The emerging rays fall on a photographic film in a pattern which shows the arrangement of atoms in the crystals.

X-rays in the new tube result from a continu-

ous current of 120 milliamperes at 45,000 v—at least six times as much power as is applied to usual x-ray tubes.

Cooling water is pumped through a uniquely designed rotating metal anode so that the stream of electrons from the special type cathode always meets a cool, fresh surface. Also, the rotating anode and cooling system permit continuous use of the machine over long periods of time. Because of the power used, a stationary anode, even if water cooled, would soon vaporize under the terrific electron impact.

For versatility in research work, the new machine is provided with extra anodes. Each is plated with a different metal, and they can be interchanged in minutes. Thus the research scientist has a variety of x-rays on ready call.

Speed of the new machine makes it possible to study atomic patterns at new ranges of high and low temperatures. Photographs that formerly took one or two hours can now be made in minutes. Thus, x-ray "snapshots" of metals as hot as 3000°F can be made before the metals vaporize or undergo chemical change.

The new unit opens up many interesting possibilities for metallurgical research.



▲ L-M pond-type chain saws "bucking" log for a veneer plant.



◀ Close-up of MAX-EL alloy steel chain saw bar, showing depth of heat treatment for tougher, longer-lasting bars.

it takes MAX-EL Alloy Steel to take a beating like this

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If your product requires a tough, machinable, non-deforming alloy steel — MAX-EL is for you. Try it. To see what information is available on MAX-EL — or any Crucible special steel — get your copy of the "Crucible Publication Catalog." Write *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

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Catalogs and Bulletins

Tool steel guide

A tool steel guide, presenting technical data on more than 50 types of tool steels and cold finished products, has been published. This 70-page brochure includes information on high speed steels, die steels for hot work, die steels for cold work, carbon and carbon-vanadium tool steels, chrome vanadium tool steels and tool steels for special purposes. Sections are also devoted to cold finished products and powdered metal. *Vanadium-Alloys Steel Co.*

For free copy circle No. 1 on postcard, p. 121.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 121.

Isolator

A data sheet contains preliminary technical data on the new miniature All-Angl shock and vibration isolator developed for use in jets and guided missiles. The bulletin includes information of use to design engineers in the electronic and air frame field on dimensions, load ranges, natural frequencies, static load deflections, and transmissibility curves. *Barry Controls, Inc.*

For free copy circle No. 4 on postcard, p. 121.

Fluid drive

An 8-page catalog and selection guide describes the Type VS class 2 Gyrol fluid drive for general purpose industrial applications. The catalog discusses the advantages and applications of the fluid drives, itemizing such factors as speed control, power savings, no-load starting, torque limitation, acceleration control, shock absorption and simplified installation. *American Blower Corp.*

For free copy circle No. 2 on postcard, p. 121.

Electric welding supplies

The Burdett Oxygen Co. has just issued its 1955 catalog. Comprising 84 pages, it is one of the largest in the industry. Illustrated and described in detail are the latest types of equipment and supplies for both gas and electric welding. In addition an entire section is devoted to industrial safety equipment. *The Burdett Oxygen Co.*

For free copy circle No. 5 on postcard, p. 121.

Oil filters

Bulk refill oil filters are described in a folder. They are used for thorough, dependable filtration of roll oils, engine oils, hydraulic oils, turbine oils, quench oils and other industrial oils. Features include: uniform, depth-type filtration, three types of filter media to meet a wide range of filtration problems due to contaminated industrial oils, quick opening covers, electric, steam or hot water heat to provide the exact oil temperatures required. *Filtration Div., Houdaille-Hershey of Indiana, Inc.*

For free copy circle No. 3 on postcard, p. 121.

Die casting

Model 200 die casting machine is described in a bulletin. This high-pressure hydraulic machine can be used for zinc, tin or lead, etc. Hot metal end can be easily changed to convert to cold chamber machine. The many features and advantages are given, plus general specifications. *The Cleveland Automatic Machine Co.*

For free copy circle No. 6 on postcard, p. 121.

FREE TECHNICAL LITERATURE

Bright rhodium

A 4-page bulletin describes the bright rhodium process. It contains valuable information on: bath preparation and control, operating conditions, equipment requirements, determination of rhodium in plating solution. A table lists the physical properties of rhodium. *Sel-Rex Precious Metals, Inc.*

For free copy circle No. 7 on postcard, p. 121.

Golden finish

A red oxide buffing compound, for producing a bright golden finish on copper or copper plate, has been announced. Trademarked Colorcopper, the new compound is a combination of specially processed iron oxide and saponifiable wax. Cakes are molded in individual trays as a safeguard against breakage during shipment. *Russell H. Burns Compound Co.*

For free copy circle No. 8 on postcard, p. 121.

Levers, control units

An illustrated 16-page bulletin presents the extensive Batavia line of levers and control units. Including a photographic chart to show how special levers are assembled from standard forgings, the bulletin contains detailed drawings, product illustrations and application photos. To meet out-of-the-ordinary requirements, established designs may be easily modified, as standardized forgings are highly interchangeable. *Batavia Metal Products Corp.*

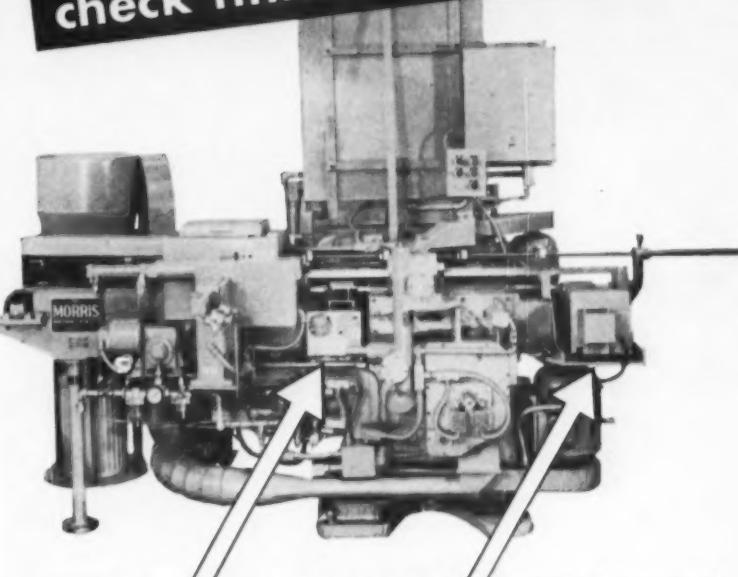
For free copy circle No. 9 on postcard, p. 121.

Flexible couplings

Where to use and how to specify flexible couplings, to eliminate accidental shaft misalignments and load shocks, is the subject of a bulletin. Designed to help operating, production and maintenance personnel concerned with getting efficient performance from heavy and light duty motor drives, the bulletin provides data for proper specification of the recommended coupling size for a range of motor drives from $\frac{1}{2}$ hp at 600 rpm to 250 hp at 3600 rpm. *Smith & Serrall, Inc.*

For free copy circle No. 10 on postcard, p. 121.

**Built-in SCALES
pre-set machine and
check finished product**



PRE-SET BY EXACT WEIGHT
In MORRIS PISTON MILLING MACHINE, scale No. 1 determines amount of overweight that must be removed to balance pistons. Linkage transfers reading to depth of cut and sets machine for milling off the correct amount of excess pad.

INSPECTED BY EXACT WEIGHT
After milling, piston travels to the second scale where it is checked against predetermined weight. The SHADOGRAF scale is adjusted to one gram, plus or minus. Should final check show over or under this amount, machine is automatically stopped.



The above application shows how EXACT WEIGHT precision designed scales can be fitted into modern machine tooling to bring your operations a step nearer automation.

If you are now designing machines or products that require accurately controlled weight as a part of their manufacture, investigate our SHADOGRAF Scale application. These scales can be easily built into most modern production machines. Their absolute accuracy adapts itself to complete electronic application and control.

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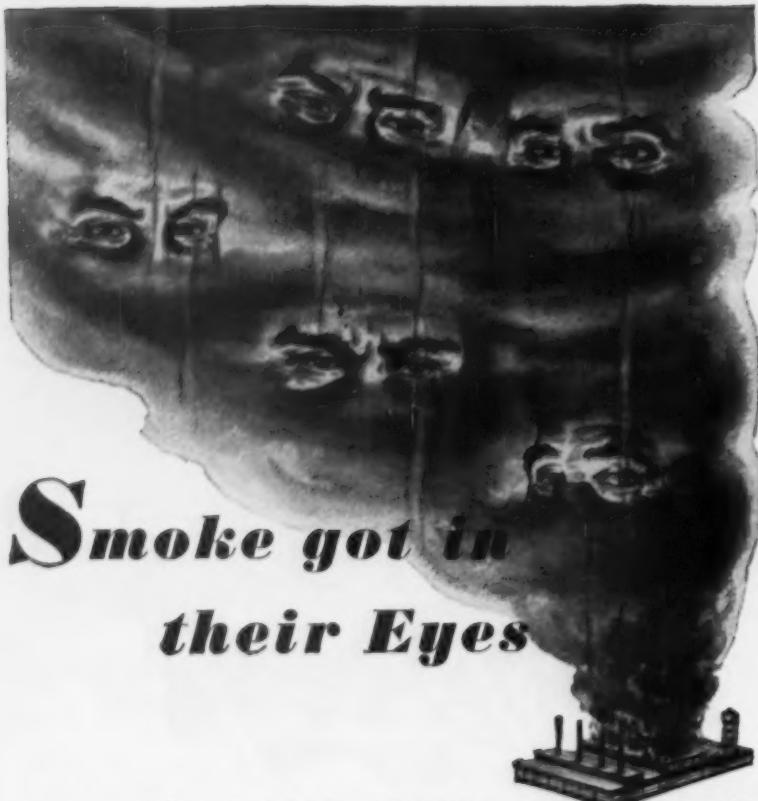


**Exact Weight
Scales**

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Smoke got in their Eyes

... but BEFORE the Fire!

Yes, the Men in Authority couldn't see the need—the vital need—for the right kind of fire protection. And fire struck, as always, when least expected—devastating fire that destroyed irreplaceable records, costly machines, buildings and supplies which will take months—months of no production—to build and replace.

Statistics prove that too many fires result from failure to be ready for them—particularly at key operation points where fire can hit like lightning, crippling operations—dealing a death blow to production!

Are your operations safe? A survey by Cardox will show you how CARDUX "Low Pressure Carbon Dioxide Systems" can protect the danger spots in your plants against fire—eliminate fire extinguishment losses entirely. A few lines on your letterhead will bring full, eye-opening information.

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FIRE EXTINGUISHING SYSTEMS

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Offices in Principal Cities

FREE TECHNICAL LITERATURE

Data storage

A new type magnetic storage device which combines the advantages of a magnetic drum and tape recorder, is detailed in a folder. Rapid access time and large storage capacity at reasonable cost are the outstanding features of the instrument. Principal applications are in the fields of inventory control, data reduction, trend recording and table storage. *Brush Electronics Co.*

For free copy circle No. 11 on postcard, p. 121.

Electric furnace fume

A new bulletin on the subject of preventing atmospheric pollution due to fume produced by electric steel melting furnaces has been issued. It has four illustrated case histories showing how typical metalworking plants have used the company's Dustube cloth-tube-type collectors to trap furnace fume before it escapes to atmosphere. *American Wheelabrator & Equipment Corp.*

For free copy circle No. 12 on postcard, p. 121.

Integral finned tube

The Trufin Opportunity Book illustrates and describes the integral finned tube. This tube maintains constant efficiency—fins can't shake loose because of vibration, temperature changes or varying pressures. Trufin also permits the design of smaller units which results in real savings. It is available in a wide range of sizes and alloys in copper, copper base alloy, aluminum, electric-welded steel and bi-metal. *Wolverine Tube, Div. of Calumet & Hecla, Inc.*

For free copy circle No. 13 on postcard, p. 121.

Carloading guide

Forty-four pages of usable facts that can help you lower freight bills, end pilferage, reduce loss and damage claims, reduce container costs and speed packaging and shipping, are available in a handy little book. Included is Signode's complete line of hand and power strapping tools and machines, strapping, seals and accessories. *Signode Steel Strapping Co.*

For free copy circle No. 14 on postcard, p. 121.

FREE TECHNICAL LITERATURE

Heating units

A 12-page bulletin describing induction heating units for heat treating, brazing, soldering, and heating for forming or forging has been issued. Comprehensive descriptions and technical data on 5, 10, 25 and 50 KW sizes are listed. Included are water systems diagrams and a discussion of standard accessory equipment. *High Frequency Heating Div., Lindberg Engineering Co.*

For free copy circle No. 15 on postcard, p. 121.

Potentiometer

The Portable Potentiometer whose design filled the need of a unit capable of providing extreme accuracy to be used as a means of checking installations of temperature measurement and control instruments, both in the laboratory and field, is described. It is readable to .025 millivolts. *Wheelco Instruments Div., Barber-Colman Co.*

For free copy circle No. 16 on postcard, p. 121.

Hydraulic attachment

A hydraulically operated attachment designed for automatic dumping of skid boxes or racks and used with its low-lift platform trucks, is detailed in a new truck engineering bulletin. The attachment provides a fast, convenient means of transporting and dumping bulk commodities such as salt, ashes, glass cullet, foundry sand or dry chemicals, plus small forgings or castings and like materials. Application, design and operational information is given. *The Elwell-Parker Electric Co.*

For free copy circle No. 17 on postcard, p. 121.

Amplifier system

A booklet which describes Consolidated System D of amplification is available. This system was developed to provide industrial research with a high-gain, lightweight, reliable, precision amplifier system for use as a companion unit to recording oscilloscopes. This equipment fulfills all the requirements for both airborne and laboratory instrumentation. Operating specifications and a price list are included. *Consolidated Engineering Corp.*

For free copy circle No. 18 on postcard, p. 121.

Spincraft did it for General Mills

Spincraft can do it for you!



15 Different Operations —

The sphere, protecting the delicate sensing instruments, is completely fabricated by Spincraft. The sphere consists of an outer steel and inner aluminum shell separated by insulating material. The two hemispheres are joined together by an ingenious locking and sealing arrangement. Spincraft's complete fabrication responsibility involved spinning, machining, arc-welding, spot welding, brazing, grinding, sawing, drilling, braking, stamping, phosphate plating, anodizing, painting, assembly and pressure testing. Craftsman (above) is shown assembling a Flight Recorder.



Write for Spincraft data book. If you have a specific problem, tell us about it — no obligation.

WORKSHOP OF AMERICAN INDUSTRY SINCE 1878

World's largest plant fully equipped for all types of metal spinning • deep drawing • stamping • fabricating



Spun spheres protect mechanical fingers of world's toughest recorder

another example of Spincraft's "start-to-finish" fabrication



This aircraft Flight Recorder, manufactured by the Mechanical Division of General Mills, etches a continuous 300-hour record of heading, air speed, vertical acceleration and altitude on aluminum foil. Each Recorder is fully-enclosed and protected in a specially fabricated sphere — made by Spincraft. The recording device, when enclosed in the sphere, is designed to withstand shocks of 100G's and resist temperatures of 2000°F up to 30 minutes.

This is another example of Spincraft's versatility and manufacturing skill. We offer complete facilities for contract manufacture of finished parts, assemblies and complete products.

Take advantage of our modern tools for spinning, deep drawing and stamping as well as complete fabrication. They can pay off in savings for you.

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SKILL WILL DO IT®
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One truck does the work of many!



THE BROOKS

LOAD LUGGER



picks up



hauls



dumps



puts down

WHAT IT IS

The BROOKS LOAD LUGGER is a flat-bed truck body with a pair of hydraulic-powered hoisting arms, which is mounted on any truck chassis of suitable capacity. Standard models lift pay loads of up to 18,000 pounds at a time. Some special-purpose models lift much heavier pay loads.

LOAD LUGGER CONTAINERS are patented, tilt-dumping containers with deep, leak-proof bottoms. Capacities range from $1\frac{1}{2}$ to 14 cubic yards for standard models. Some special-purpose models are much larger. A variety of open and closed containers handle solid materials, powders, sludge, liquids, and gases. Special pallets handle free-standing and unit-packaged materials.

Controlled by the driver from his cab, the truck-mounted Brooks Load LUGGER lifts a Load LUGGER Container onto its steel deck, carries it well forward for correct load distribution, cradles it between steel sidewalls for travel safety, hauls it away, dumps or spreads its contents, then returns the container and puts it down.

HOW IT IS USED

The LOAD LUGGER SYSTEM of materials handling calls for a number of Load LUGGER Containers to be placed at points of need. These containers collect material as it accumulates, which reduces handling and eliminates loading crews. Then, loaded containers are picked up, hauled away, dumped, and returned on a regular schedule by a truck-mounted Brooks Load LUGGER, which replaces many conventional trucks and eliminates loading time formerly required.

WHO USES IT

Industrial operations all over the country (quarries, foundries, steel mills, paper mills, refineries, chemical plants, brick plants, metal fabricators, etc.) use this versatile equipment to handle raw materials, finished products, and waste materials. Contract haulers of wet and dry refuse prefer Load LUGGER equipment, as do scrap metal dealers, construction contractors, cemetery operators, and sugar cane growers. Government approval is evidenced by the many municipal, state, and federal installations. New uses and new users, such as cable reel handling by power and telephone companies, are constantly coming into the picture.

WHY THEY LIKE IT

The Brooks Load LUGGER has no cumbersome superstructure or extra operating gadgets because of its patented simplicity, clean design, and sturdy construction. This results in a lower first cost, lower maintenance costs, the ability to carry more pay load on a given truck chassis, and a clear deck for multipurpose use. Its double-acting hydraulic cylinders, four-point container suspension, secure container cradling, and fully controlled tilt dumping are important contributions toward greater operational safety.

Load LUGGER Containers are job-designed and job-proved. They are low and easy to load to full rated capacity. They dump clean because they are tilt-dumping, and they have no bottom openings to allow messy or insanitary leakage. Appropriate models are dust-proof, rat-proof, fly-proof, and almost odor-proof.

BROOKS EQUIPMENT & MFG. CO.

2034 DAVENPORT ROAD
KNOXVILLE, TENNESSEE

FREE TECHNICAL LITERATURE

Safety solvent

Development of new and improved Turco-Solv, safety solvent to replace carbon tetrachloride in all cleaning operations, has been announced by the manufacturers of specialized industrial cleaning compounds. The new material offers greatest possible solvency for faster, most effective removal of grease, oil and carbon film from brush holders, insulators, etc. Yet it is non-explosive, and non-flammable (flash point over 200°F., TCC). *Turco Products, Inc.*

For free copy circle No. 19 on postcard, p. 121.

Air line lubricator

An illustrated bulletin describing the "first forward step in air line lubricators in more than 20 years" is available. The Airliner uses all the time-tested principles of air line lubrication but carries those principles one step forward, to achieve more than 100% greater efficiency, to cut 50% off lubricant and maintenance costs at no increase in price. Many practical advantages of the Airliner are listed in the bulletin. *Gits Bros. Mfg. Co.*

For free copy circle No. 20 on postcard, p. 121.

Kennametal

Kennametal, a series of cemented hard carbide materials, is described in a booklet. It describes facilities of the company; products and applications; characteristics and grades, and outlines the mechanical and physical properties of Kennametal and Kentanium. The latter is an engineering material for use at elevated temperatures. *Kennametal, Inc.*

For free copy circle No. 21 on postcard, p. 121.

Low voltage switchgear

A new line of low voltage, metal enclosed switchgear available in indoor and outdoor arrangements has been announced. The switchgear features new circuit breakers rated 600 amperes, 25,000 aic at 600 volts (LA-25), and 1600 amperes, 50,000 aic at 600 volts (LA-50). *Allis-Chalmers Manufacturing Co.*

For free copy circle No. 22 on postcard, p. 121.

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the post card.

This section starts on page 116

Bearings

A handy catalog gives comprehensive but concise information on bearings. Section one covers anti-friction bearings for every trade and every purpose—ball, roller and thrust bearings, steel balls and steel rollers. Section two covers ball bearing and flexible roller bearing transmission equipment, while section three gives information on solid and flexible roller bearings. Conversion tables and other specifications are included. *Pollard Bearings Ltd.*

For free copy circle No. 23 on postcard, p. 121.

Dial indicators

Described in a 4-page bulletin are Em-re dial indicators. The fully jeweled and completely shockproof movements of these indicators give accurate, repeated readings on any application from severe production inspection to careful laboratory measurements. The complete line of 24 models is built around only 31 parts. *Petz-Emery Inc.*

For free copy circle No. 24 on postcard, p. 121.

Math-a-graph

The Math-a-graph transforms measurements, lines and flat shapes into forms that have depth, volume and function. It introduces a new approach to technical drawing. Its makers explain in their catalog how Math-a-graph's ability to materialize an idea—an object—might well be an important item in a business that involves engineering—creating. *The Wilkinson Co.*

For free copy circle No. 25 on postcard, p. 121.

Electrical control system

A unique new electrical control system for predetermined repeat or non-repeat cycle on any machine with a mechanical tripping mechanism is described. This versatile, easily installed system assures maximum operator safety, simplified machine operation and increases production. It is especially recommended for installation on practically all types of presses, but is equally adaptable to many other types of machines. *Security Controls, Inc.*

For free copy circle No. 26 on postcard, p. 121.

Thermostat bi-metal

A data sheet on a thermostat bimetal, ASC-3, has been released. ASC-3 is the latest addition to American Silver's growing line of thermostat bimetals. It is a versatile material with a wide range of linear deflections between -50 degrees and +700 degrees F. *American Silver Co.*

For free copy circle No. 27 on postcard, p. 121.

The "600" group

An interesting catalog which chiefly concerns itself with the machinery division of this huge company is available. New, modern secondhand and reconditioned machinery is sent to firms all over the world through this "600" Group. Machinery is of such a wide variety that it cannot be listed here. There is also a raw materials division (iron and steel scrap, scrap nonferrous metals, etc.) *George Cohen Sons & Co. Ltd.*

For free copy circle No. 28 on postcard, p. 121.

Postcard valid 8 weeks only. After that use 7/14/55 own letterhead fully describing item wanted.

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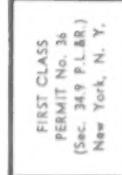
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Co. Address

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Zone

State



THE IRON AGE
Post Office Box 77
Village Station
NEW YORK 14, N.Y.

Limitamp control

Limitamp high-voltage motor control is the subject of a bulletin announced by the company's Industry Control Department. The publication outlines in detail the features of the high-voltage, current-limiting, fused starters for coordinated control of squirrel-cage, synchronous, wound-rotor, and multi-speed motors. Simplified installation and reduced space requirements are covered in the 12-page publication. *General Electric Co.*

For free copy circle No. 29 on postcard, p. 121.

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No postage necessary if mailed in the United States
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THE IRON AGE
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Tool holders

Mechanical tool holders for use with "Throwaway" type carbide inserts are described in an illustrated folder. The advantages listed include rugged design and economy of operation. Available styles are also listed, plus prices and specifications. *Newcomer Products, Inc.* For free copy circle No. 33 on postcard, p. 121.

Nickel alloy steel

A 76-page booklet presents six papers discussing a new nickel alloy steel capable of providing tensile strengths up to 300,000 psi. The subjects covered include heat treatment, processing and design considerations. The development of ultra high strength steels has led to the use of steel at strength levels heretofore considered impractical, particularly in aircraft structural components such as landing gears where high strength-weight ratio is vital. *The International Nickel Co., Inc.*

For free copy circle No. 34 on postcard, p. 121.

Cleaning equipment

The manufacturer of blast cleaning and dust control equipment has announced the availability of a bulletin on Hydro-Finish liquid blast cleaning equipment. This bulletin contains photos, dimensions, sizes and features of all models of the EZ-2 and EZ-3 machines. The process is especially useful in solving cleaning problems such as deburring, surface finishing and lubrication control, surface preparation for coating, dye and mold maintenance, and general maintenance. *Pangborn Corp.*

For free copy circle No. 31 on postcard, p. 121.

Automatic hitch feed

A bulletin pictures and describes the Automatic Surefeed. This comes in 2" and 3" models and can be mounted right on the die set so that the two units can be handled as one. No press or feed alterations are required when mounting in any ordinary press. *The Product Machine Co.*

For free copy circle No. 32 on postcard, p. 121.

Huglock

Engineering data, specifications and price list on Huglock self-locking nuts has just been released in a 24-page section of their catalog by National Machine Products Co. Huglock maintains its locking action through repeated removals, and locks to the bolt, whether the nut is seated or unseated. *National Machine Products Co.*

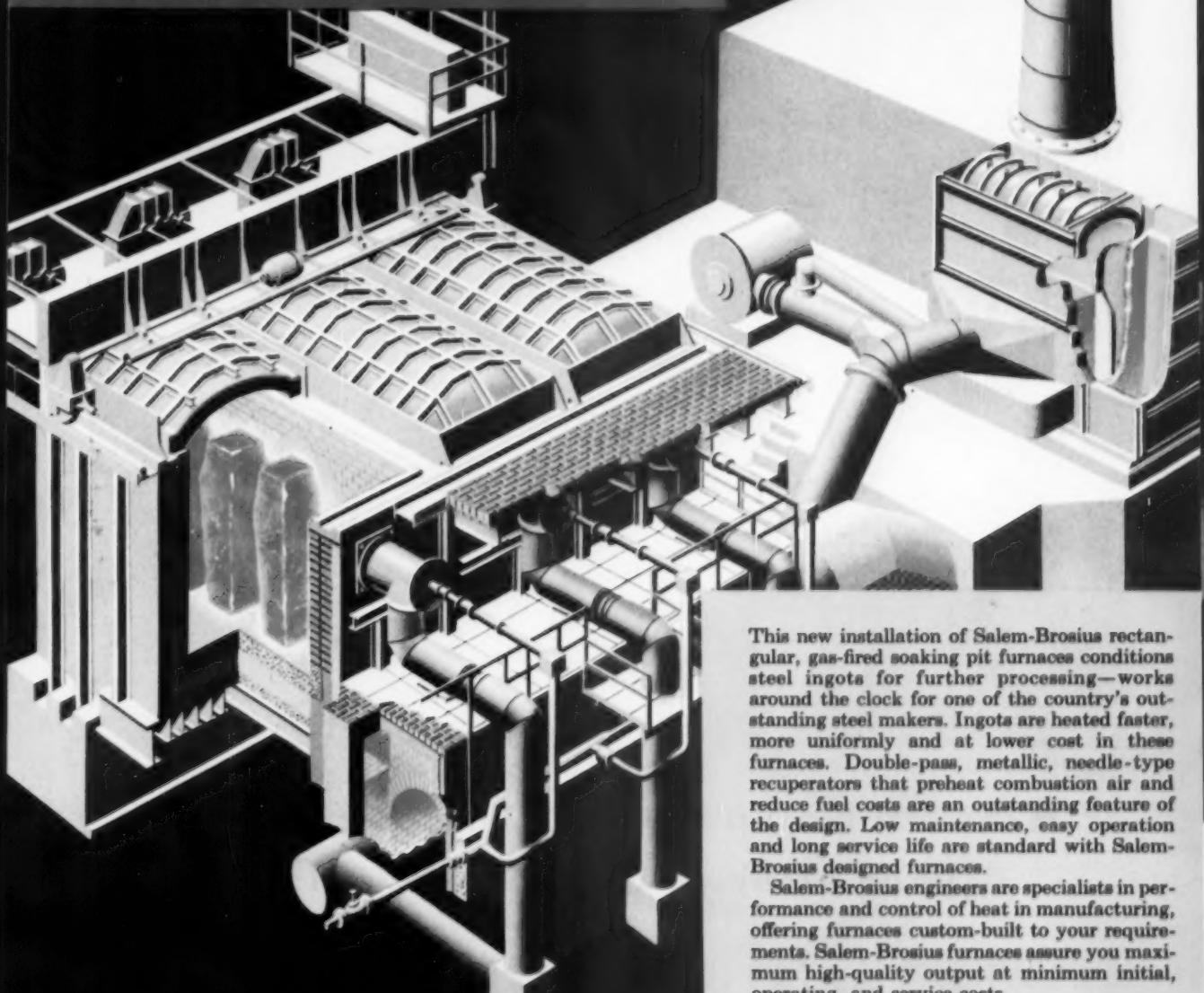
For free copy circle No. 35 on postcard, p. 121.

Adhesives, coatings

An illustrated folder on the use of 3M brand adhesives, coatings and sealers for joint-sealing, and bonding and protecting sheet metal in manufacturing and construction is available. The 8 1/2" x 11" 4-page folder describes and illustrates eight typical sheet metal applications for nine of the firm's materials, including weld-through sealer, metal filler, and duct sealer and ribbon sealer. *Minnesota Mining and Manufacturing Co.*

For free copy circle No. 36 on postcard, p. 121.

Making heat perform better is a Salem-Brosius specialty



This new installation of Salem-Brosius rectangular, gas-fired soaking pit furnaces conditions steel ingots for further processing—works around the clock for one of the country's outstanding steel makers. Ingots are heated faster, more uniformly and at lower cost in these furnaces. Double-pass, metallic, needle-type recuperators that preheat combustion air and reduce fuel costs are an outstanding feature of the design. Low maintenance, easy operation and long service life are standard with Salem-Brosius designed furnaces.

Salem-Brosius engineers are specialists in performance and control of heat in manufacturing, offering furnaces custom-built to your requirements. Salem-Brosius furnaces assure you maximum high-quality output at minimum initial, operating, and service costs.

We would like to tell you more about the efficiency of these new units, and also about the well-known Salem-Brosius circular soaking pits.

If your modernization or expansion plans call for heating or heat treating furnaces of any kind, furnace charging or forging manipulation equipment, valves, or hot materials handling machinery; write, wire, or phone Salem-Brosius!

SALEM-BROSIUS, INC.

CARNEGIE, PENNSYLVANIA

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**What's Your
Company's
Experience
with
Eye Accident
Costs?**



**Here's a Company that has been ahead
year after year...for 21 years!**

Let's look at a company that has had an AO† Eye Protection Program in operation for a long time and see whether it pays over the long pull. Does the protective equipment cost almost as much as the accidents it prevents? Considerably less? How much less? These are good questions and deserve an answer.

In one of the twenty-one years, the company spent about \$6,000 on eye protection but saved \$20,000 on prevented eye losses. In this year, the year this company saved the least, it

was still ahead by \$14,000. In another year when the company spent about \$7,000 on eye protection, it saved approximately \$90,000 on prevented eye losses. Estimated savings: \$83,000. **OVER THE 21 YEARS, THIS COMPANY WAS SAVED ABOUT \$874,000 — AND THAT'S NET.**

You may do even better. Ask an AO Safety Representative to call. Or write American Optical Company, 577 Vision Park, Southbridge, Massachusetts.

American Optical
SAFETY PRODUCTS DIVISION

†T.M. Reg. by American Optical Company

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

For the
finest in protection
— look for
the AO monogram
on
safety lenses
and frames.



50-ton crane becomes 85-ton crane with no increase in size



United States Steel's Edgar Thomson Works in Braddock, Pennsylvania, needed new and heftier crane equipment to handle larger ladles. One requirement was four new crane trolleys which were to operate on the same bridges, if possible, and in exactly the same clearances as before.

The trolleys had to be stronger but no larger than before; so ordinary steel wouldn't do. Needed, was a steel of *exceptional strength* which could be *welded easily*. Lots of alloy steels could have met the strength

requirements; but USS "T-1" Steel was the *only* steel that could supply not only the required strength, but good weldability as well.

"T-1" Steel plate—in $\frac{3}{4}$ " and 1" thicknesses—was used in box girders and lateral stiffener plates of the trolleys. This change increased the crane capacity from 50 to 85 tons with no increase in size.

The structure was welded with AWS E12015 electrodes. It was as easy as welding carbon steel. No stress relief was needed. And the

welds developed the full yield strength of the steel: 90,000 psi. minimum.

Remember this story when you must weld very high strength parts—parts that must operate at temperatures as high as 900°F. or as low as 40°F. below zero, parts that must withstand tremendous impact abuse, abrasion or tensile stress. Then consider USS "T-1" Constructional Alloy Steel. For full particulars write: United States Steel, Room 4768, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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USS  **CONSTRUCTIONAL ALLOY STEEL**



UNITED STATES STEEL

ABRASIVES: Greater Safety

Fiber glass reinforcing in both abrasive cut-off wheels and grinding wheels has given these widely used shop tools an improved safety factor . . . Downtime reduced.

Use of fiber glass fabric as reinforcement has made it possible to produce abrasive cutting wheels with a higher safety factor at operating speeds up to 16,000 sfpm, according to the Carborundum Co. of Niagara Falls, N. Y.

Fewer Accidents

The high speed safety of the new Carboflex wheels has helped increase production and reduce time lost through accidents in foundries, steel mills and factories. Their longer operating life has also aided in lowering production costs.

Aluminum oxide abrasive was

used in the wheels for rough grinding, weld removal, cut-off and slotting operations on ferrous and nonferrous metals. Silicon carbide wheels reinforced with fiber glass fabric were used on nonmetallic materials, including plastics reinforced with fiber glass fabric.

High Bursting Speed

Laboratory tests showed that rigid Carboflex wheels had a bursting speed of up to 40,000 sfpm, as opposed to 20,000 sfpm for unreinforced wheels and 27-32,000 sfpm, for wheels reinforced with other man-made textile fibers. Fiber

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 121. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

glass fabric reinforced wheels had a high flexural strength index of 7000 and an impact strength rating of 400 ft-lb per square in.

Normal operating speed for all types of fiber glass fabric reinforced wheels is still 9500 to 16,000 sfpm, but glass cloth reinforcement provides a greater safety factor.

Wheels maintain peak efficiency at high speeds and high surface temperatures. Since fiber glass is a ceramic material like the abrasive, it wears away evenly at almost the same rate, instead of fraying or glazing at the grinding surface.



ALLEN KEYS

New bright finish
New kit
Lower prices**

Now the hex keys furnished in Allen key sets have a high luster coating — better looking — rust resistant — makes size markings easier to read.

Available in six sets, all packaged in new red-trimmed plastic envelopes.

No. 603	11 short arm keys	3/32" through 5/8"
*No. 604	7 short arm keys	5/64" through 1/4"
*No. 605	6 short arm keys	.050" through 5/32"
No. 606	11 short arm keys	.050" through 3/8"
No. 614	11 long arm keys	3/32" through 5/8"
*No. 616	9 extra long arm keys	5/64" through 3/8"

*Bright Coated Keys **On Nos. 604 and 605

Order from your Allen Industrial Distributor or write us for bulletin C38 for your files.

ALLEN Manufacturing Company, Hartford 2, Connecticut, U.S.A.



Fiber glass reinforced . . .

TECHNICAL BRIEFS

Computer:

Provides simple method for finding days and dates.

A simple computer developed at Temco Aircraft Corp. has considerably simplified the job of figuring days and dates for the company's 7000 employees.

Until recently it was necessary to flip through the calendar to find out what day of the month a leave of absence would end, or an automatic wage raise would begin.

Answers In Less Time

Now, a circular computer provides the same information in two-thirds less time than it took to find it on the calendar. The computer—called Calculator—can project its user to any desired date in the future, or backtrack just as easily to a date in the past.

Has Many Uses

Personnel has used the Calculator to determine quickly the number of days employees spend on leave; when they are eligible for progressive wage increases; how much pro rata vacation a terminating employee is due, and answers to a half-dozen other types of record keeping questions.

Operation of the device is based on formulas developed by the Personnel department to quickly obtain answers to these problems.

The device is circular, and divided into 365 equal parts.

Lines Scribed On Blank

To make the instrument, Temco put a jig-borer operator on the job. He centered an 18-in. square sheet of heavy aluminum on his jig-borer table, put a scribing attachment in the spindle, and positioned the turntable's indexing head attachment for proper spacing of indices.

By traversing the table for each mark, the operator scribed 365 evenly-spaced lines in a circular pattern around the aluminum square.

The 9-in. diam indexed circle was cut out on a punch press and photographed onto metal template stock. Then the reproduction was placed in a lathe for a precise cir-

Specify
Michigan Tubing
for economy and versatility



The
or
ABC
MST

A LWAYS MAKES POSSIBLE
BETTER PRODUCTS
CAT LOWER COST

A Quality Product

ROUND

1/8" to 4" O.D. 7 to 22 gauge

SQUARE **Gauge**

3/8" to 3/4" 16 thru 22
3/4" to 1" 11 thru 22
1" to 2" 11 thru 20
2" to 3" 11 thru 18

RECTANGULAR

3/8" minimum side to 3" maximum side

Carbon 1010 to 1025

Standard Sizes

Tube Diameter O.D. Size	Maximum Wall Decimal	SWG Gauge	Minimum Wall Decimal	SWG Gauge
1/8	.065	16	.022	24
1/4	.083	14	.022	24
5/16	.095	13	.022	24
3/8	.095	13	.022	24
7/16	.095	13	.028	22
1	.095	13	.028	22
1 1/8	.095	13	.028	22
1 1/4	.095	13	.035	20
1 1/8	.095	13	.035	20
1 1/2	.120	11	.035	20
1 1/8	.120	11	.035	20
1 1/4	.120	11	.035	20
1 1/8	.180	7	.035	20
2	.180	7	.035	20
2 1/8	.180	7	.035	20
2 1/4	.180	7	.035	20
2 1/2	.180	7	.035	20
2 1/4	.180	7	.035	20
2 1/2	.180	7	.035	20
2 1/4	.180	7	.042	19
3	.180	7	.042	19
3 1/8	.180	7	.042	19
3 1/4	.180	7	.042	18
3 1/8	.180	7	.049	18
3 1/4	.180	7	.049	18
3 1/8	.180	7	.049	18
3 1/4	.180	7	.049	18
4	.180	7	.049	18

For almost
40 years

Michigan has been manufacturing tubular parts for leading manufacturers. This acceptance of Michigan tubing has been won by meticulous attention to customer requirements and the supplying of the very best in tubing. The following advantages of low cost manufacture and utmost dependability are yours when you specify Michigan for tubular parts in the fabrication of your products:

1. It is fabricated in round, square and rectangular shapes, in a wide range of sizes;
2. It is always of uniform strength, weight, ductility and weldability;
3. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted and rolled.
4. It can be formed or machined in your plant or prefabricated at Michigan.



Consult Michigan

For engineering and technical help in the selection of tubing best suited to your needs.

Michigan STEEL TUBE PRODUCTS CO.
THE OLDEST NAME IN ELECTRIC
RESISTANCE WELDED STEEL TUBING

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producing
WALLINGFORD

Quality

is a
SCIENCE
AND
an ART

**WELDED STAINLESS STEEL
TUBING and PIPE**

Producing stainless steel tubes and pipe of the highest uniform quality takes the finest modern equipment. And, at Wallingford, whenever there is a better machine or a more advanced quality control device, it is obtained and integrated into our manufacturing operations.

But other less tangible factors . . . equally essential to highest product quality . . . can be supplied **only** by the expert judgment and skilled hands of experienced artisans. For this reason, personnel at Wallingford is a picked team of engineers, metallurgists and production specialists who work together to produce the finest.

FOR A BETTER PRODUCT, DELIVERED ON SCHEDULE, CALL ON WALLINGFORD.

Welded Ornamental, Mechanical, Pressure; Sanitary, Aircraft and Shaped Tubing and Pipe from $\frac{1}{8}$ " to 3" OD

THE

WALLINGFORD

SINCE 1922
WALLINGFORD STEEL CO.

WALLINGFORD, CONN. U.S.A.

Write today for new booklet . . . "WALLINGFORD QUALITY TUBING AND PIPE"

STAINLESS • ALLOY • HIGH CARBON • LOW CARBON • STRIP AND TUBING



Computes days, dates . . .

cular cut which sliced a 1 1/4-in. ring off the edge of the 9-in. circle.

This cut bisects each of the 365 scribe marks and allows the outer ring to turn independently. Bisected scribe lines on the outer ring coincide perfectly with those on the dial. Both pieces are mounted on a heavy aluminum base, and the inner dial, mounted on a pin, is turned with a twist of a masonite knob. A plexiglass sweep indicator, attached to the same pin, turns independently.

Index marks on the stationary outer ring are numbered, one through 365. Matching marks on the movable inner circle are grouped into months. And 52 indices on another circle—a 5 in. diam plexiglass dial which moves with the larger inner dial—represent weeks of the year.

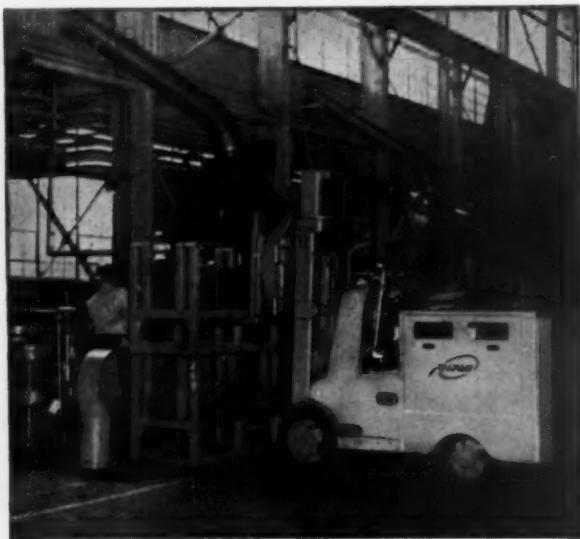
When Jan. 1 on the calendar-day circle is aligned with 1 on the outer ring index circle, every calendar day is precisely aligned with its respective day of the month.

Maintenance:

Improved chemical rubber
hose lasts longer.

Outstanding resistance to strong oxidizing acids and other chemicals has been demonstrated by a new type hose featuring a tube of Hy-palon chemical rubber.

Now being introduced commercially after two and a half years of field trials, the hose has given four times the service life of regular acid hose in a chromic acid operation and still shows no signs of failing.



After initial forging, longer lengths are placed in special tiering-type racks for convenient truck handling.



Bar forging is complete with production of disc-type end. From here, loads are trucked on steel skids.



Smaller forgings are dumped by trucks with rotating forks into gravity-feed hoppers that discharge into heat-treat furnace.

ELPAR

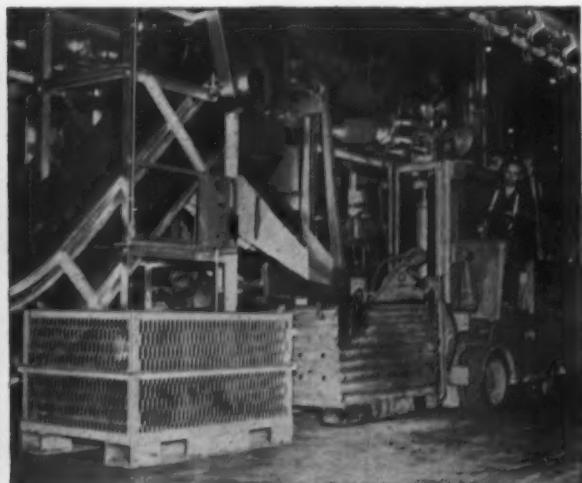
TRUCKS

Synchronize Handling of Automotive Forgings

Handling is almost 100% mechanized at this automotive forge plant. Backbone of their system is a fleet of ELPAR fork trucks of 6,000 and 8,000-lb. capacities. The trucks permit precise control of the flow of materials to and from equipment. This is vital in mass production because no machine is better than its system of supply . . . Truck breakdowns would lead to costly bottlenecks in the entire operation, but ELPAR units stay on the job because of their *built-in dependability*.

GET ALL THE FACTS—Write for the ELPAR catalog and mention your industry.

THE ELWELL-PARKER ELECTRIC COMPANY
4297 St. Clair Avenue • Cleveland 3, Ohio



After shot blasting, forgings are discharged automatically into skid bins, then trucked to inspection stations.



TOUGH!



U. S. Patent #2184926
(Other patents pending)

Is your present abrasive **tough enough** to prove itself in performance? You can't judge an abrasive by looks, claims or promises. The only test of any abrasive is its *cost per ton of castings cleaned*. Because of exclusive metallurgical characteristics, Malleabrasive gives you the lowest cost per ton cleaned of any premium abrasive on the market! This has been proved in hundreds of production tests by users throughout the country. Prove it in your own production test—put muscle behind your blast cleaning with Malleabrasive! *We GUARANTEE that Malleabrasive will give you lowest cost, per ton of castings cleaned.*

To order Malleabrasive, or for additional information on running a test, contact Globe Steel Abrasive Co., Mansfield, Ohio.

MALLEABRASIVE

**Hose has performed well
handling chromic acid from
plating tanks . . .**

Unlike ordinary rubber, Hypalon offers complete resistance to ozone attack, and retains its properties even after exposure to temperatures as high as 300°F.

Evidence of its durability is the way the new hose has performed in contact with chromic acid—one of rubber's worst enemies. Hilfinger Corp., Toledo, electroplaters, installed a length of the new hose in October 1952. It's used about every 3 months to transfer chromic acid solution from the chromium-plating machines to storage tanks, so that sludge accumulations can be removed from the plating units.

Replacement Costs Cut

The hose is in constant contact with acid during the entire two-day cleaning operation. It doesn't get flushed out until the 4400 gal of acid have been returned to the plating machine.

Solution temperature runs about 105°F, and concentration is 40 pct chromic acid by weight. After 30 months the hose shows no cracks or other signs of deterioration.

Equally outstanding results are reported after 2 years service in sulphuric acid at a concentration of 98 pct H_2SO_4 . The new hose has also proved superior for handling 15 pct sodium hypochlorite and 50 pct sodium hydroxide. A paper company reports no noticeable change after two months immersion in calcium hypochlorite and calcium disulphite liquor.



Acid resistant hose . . .

3rd in a Series . . .

OF HIGH PRODUCTION CASE HISTORIES

ASK



BAIRD

ABOUT IT

TURNING BOTH ENDS
OF A CRANKSHAFT
FORGING . . .

IN ONE CONTINUOUS
OPERATION . . .

ECCENTRICITY LIMIT
OF SHAFTS .001"

Forging hand-loaded chuck with crank pin end out . . . indexed to work station to turn and chamfer pin, face shoulder, cut relief for grinding.

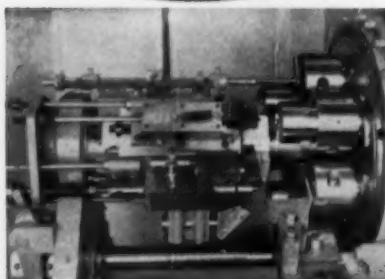
On return to loading station, work is removed and placed in adjacent chuck, long shaft end out . . . indexed to work stations to drill center in shaft end, long shaft turned and chamfered, shoulder faced, relief-cut for grinding.

PRODUCTION
151 PIECES
PER HOUR

The Baird 76H Automatic Chucking Machine is set up for double indexing with alternate chucks (6 - 7 inch) arranged to receive the shafts for (first) operating on the crank pin end and (second) operating on the long shaft end.

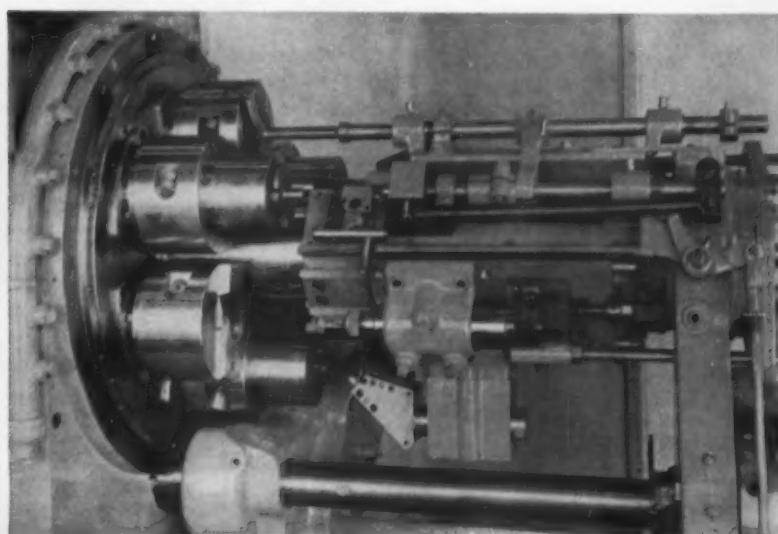
Also provided are a relieving motion mechanism to cut relief for grinding on pin end . . . a 3-to-1 reducing motion for center drilling . . . and a live center attachment to support the long shaft end while turning.

This is indeed automatic high production . . . the type of machine and tooling that can put many a manufacturer in a favorable competitive position. If you have similar parts to produce, "Ask Baird about it!" Write to Dept. IA.



ABOVE: Rear view of tooling set-up.

RIGHT: Front view of tooling set-up.



THE BAIRD MACHINE COMPANY

STRATFORD

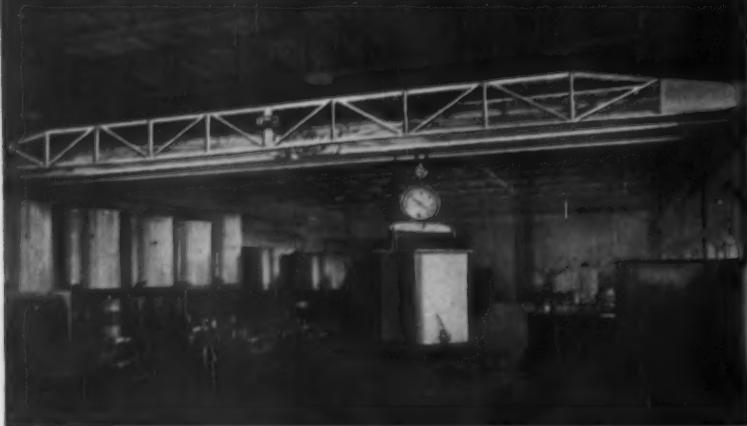
CONNECTICUT

WHERE YOU WILL GET THE HELP OF SPECIALISTS
ON THESE ESSENTIAL PRODUCTION PROBLEMS:

AUTOMATIC CHUCKING MACHINES • AUTOMATIC DRILLING MACHINES
AUTOMATIC TURNING MACHINES • AUTOMATIC FORMING MACHINES • AUTOMATIC PLATE BENDING MACHINES

76A50

**MORE CRANE FOR YOUR MONEY
...IN PERFORMANCE...IN PRICE**



For average industrial service, today's most outstanding crane investment is the Series "D" All-Electric 'Load Lifter'. Here are a few reasons:

1. Maximum strength is engineered in and minimum dead weight is engineered out through advanced design and distribution of metals.
2. Heavy-duty, three-girder bridge construction eliminates whipping and skewing.
3. Bridge and trolley wheel axles rotate on ball bearings; ball and roller bearings are used throughout for smooth efficiency.
4. Permanently aligned motor and drive shaft.
5. All gearing operates in oil in sealed housings.
6. Spotting accuracy is simplified by fast-acting brakes and variable-speed magnetic control, operated by push buttons on floor controlled cranes, and by master switches on cage controlled cranes.
7. Safety devices provide complete protection for man, load and crane.
8. Operational and maintenance conveniences assure all-around economy.
9. Standardization and mass production methods permit prices far lower than those for other cranes designed for similar service.

The efficient performance and permanent economy of Series "D" All-Electric 'Load Lifter' Cranes can help you reduce your load-handling costs substantially. Capacities from 1 to 20 tons. Available in three basic types and three trolley styles. Ordering is easy. Just write for Catalog 221, then select the size and type best suited to your requirements.

Load Lifter CRANES



MANNING, MAXWELL & MOORE, INC. Muskegon, Michigan
Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

Instruments:

**Foolproof pressure gage
is extra sensitive.**

A simple, compact, foolproof manometer uses a unique twin-fluid principle to indicate pressure changes as small as 1/500th psi. Developed by Ryan Aeronautical Co., San Diego, Calif., for pressure testing large fuel tanks, the 18-in. high instrument can, with minor changes, be adapted to other pressure checking needs.

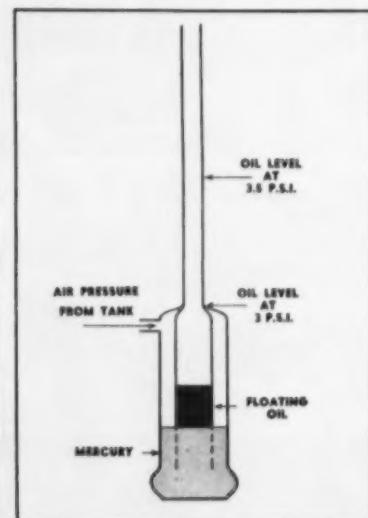
Check Slight Leaks

To insure fuel tank tightness, Ryan subjects them to a pressure of 3.5 psi for 45 minutes. During this interval, very slight leaks may cause only a minute drop in the applied pressure.

To detect these slight pressure changes, water manometers were originally used. Water has the correct specific gravity for indicating slight pressure changes with good visibility, but one lb per sq in. of pressure will support a column of water of about 27 in. high.

Needed a Stepladder

This meant that to get pressure readings between three and four psi, the water column had to be 10 ft tall. Employees had to climb a stepladder to check readings. Also, the equipment was difficult to move and water evaporation was a constant problem.



Oil on mercury . . .

CRAZY, MAN!

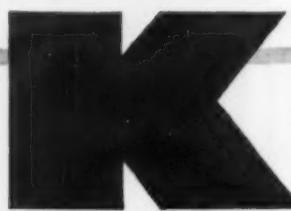
[or why it pays to use KEOUK Silver Pig]

Chief Keokuk: "Me try teach Little Chief Injun drum. Him say him already cool and gone the most. What him mean?"

Princess Wenatchee: "Junior sends a real modern message!"



Today, it pays to use Keokuk Silvery Pig Iron . . . the superior form of silicon introduction that's *always uniform* . . . never varies in composition. Because it contains a less concentrated form of silicon, it holds silicon loss to a minimum. That means money saved! So be *modern* . . . charge KEOUK by count or by magnet.



SITUATION UNDER CONTROL BY KEOUK

KEOKUK, IOWA

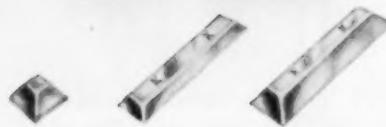
Wenatchee Division, Wenatchee, Washington

SALES AGENT: MILLER AND COMPANY

332 S. Michigan Avenue, Chicago 4, Illinois

3504 Carew Tower, Cincinnati 2, Ohio

8230 Forsyth Blvd., St. Louis 24, Missouri



Keokuk Silvery . . . the superior form of silicon introduction . . . available in 60 and 30 pound pigs and 12½ pound piglets...in regular or alloy analysis. Keokuk also manufactures high silicon metal.

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On your next structural steel project, why not utilize the experience and facilities of Fort Pitt —structural steel specialists for over 57 years.

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Endurance
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On the other hand, a mercury manometer would not indicate the very small pressure changes which might occur. Weighing 14 times as much as water, the column of mercury supported by a pressure of one lb per sq in. is less than two in. high.

Apply Twin Fluids

The problem was finally solved by using a combination of mercury and a light oil. The manometer now in use consists of a glass capillary tube blown with a larger diameter open reservoir at one end. This reservoir is inverted and placed within a closed glass container, which is attached to the pressurized tanks by a rubber tube.

Two liquids are poured into the glass container; mercury and manometer oil. The oil, dyed red for better visibility, has the same specific gravity as water and practically a zero coefficient of evaporation. The oil floats on top of the heavier mercury.

Oil is Dyed Red

The amount of mercury used is carefully measured so that when a pressure of three psi is impressed on the system, the oil, floating on top, will be raised to the opening of the small capillary tube. As the pressure rises above three psi, the red oil shoots up the tube at an accelerated rate. This gives the viewer a readily observed indication, even for pressure changes of as little as 1/500th psi.



The new and the old . . .



Series 90 Dyna-Shift

Metal-working

Techniques— for



Series 62 Preselector
Dyna-Shift

Business

Advancement



IT'S CHICAGO!

SEPT. 6 to 17

Don't miss the NMTBA's Machine Tool Show in Chicago—September 6 to 17 and don't, for better business' sake, miss our Monarch display there!

Object of the show, of course, is to demonstrate what the industry's best engineering brains have developed in the way of machines that lower costs by improving both output and accuracy.

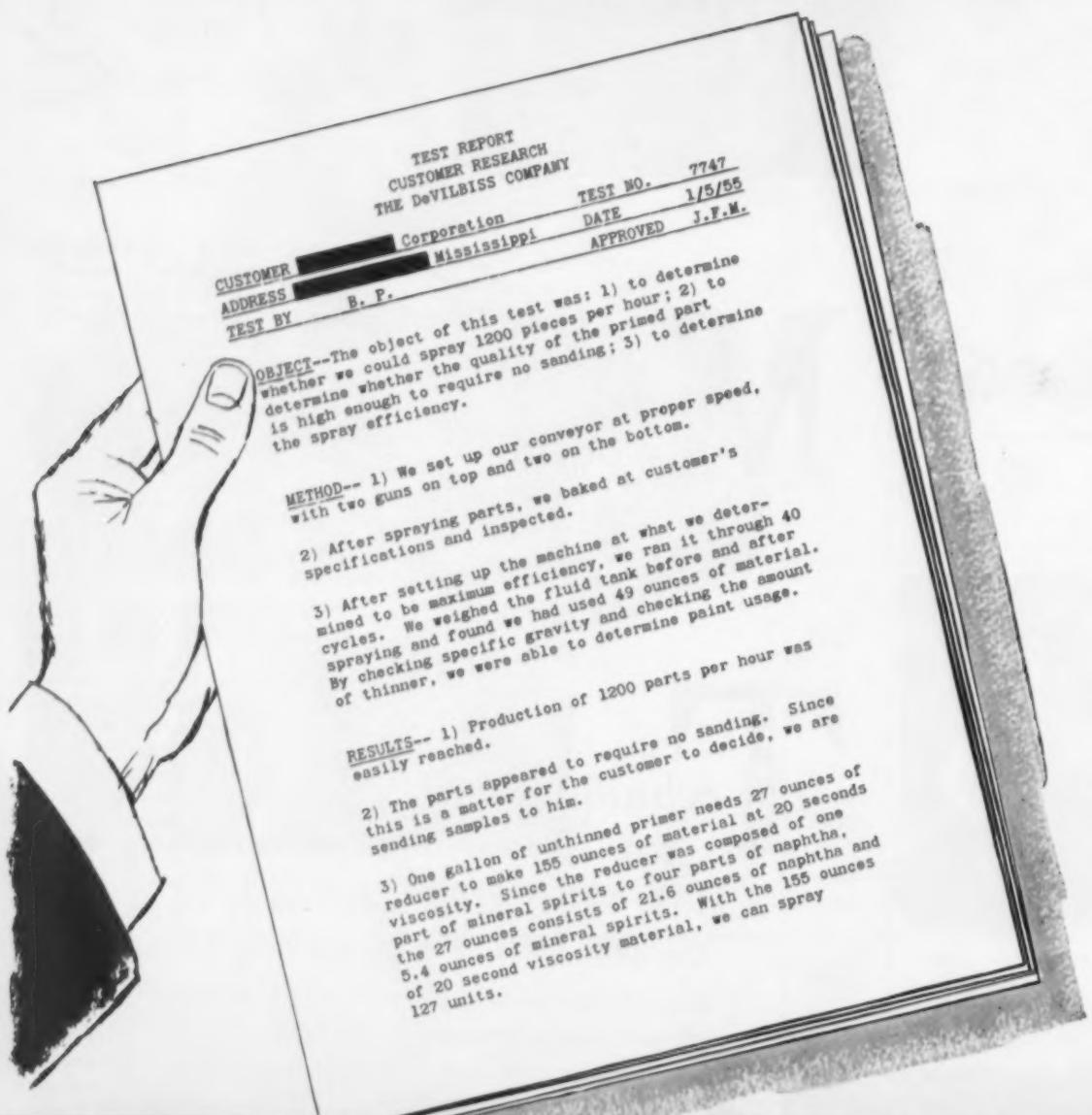
We'll be there, for instance, with a great many new lathe improvements, including two freshly announced this year. Those would be our new Series 90 Dyna-Shift Heavy Duty Lathe, plus the new Series 62 Pre-selector Dyna-Shift. So productive and so absolutely different as to defy comparison, they are two of many reasons why you cannot afford to miss *the world's best investment—in action.*

We'll have more, too. And looking them over will be good for business—yours and ours, both. See you at the show! THE MONARCH MACHINE TOOL COMPANY, SIDNEY, OHIO.

Monarch
TURNING MACHINES
ACCURACY • ECONOMY • DURABILITY
LONG LIFE • SHARP CUTTING EDGES

FOR A GOOD TURN FASTER TURN TO MONARCH

Know in advance the benefits



Coating speeds from 3,000 to 14,000 square feet per hour are possible with DeVilbiss Automatic Horizontal Transverse Machines. Here, a test production run is being made on metal panels in modern DeVilbiss Research Laboratory.



Vacuum-cleaner housings like these are typical of parts that can be finished automatically on DeVilbiss Chain-On-Edge Machines. From 500 to 4,500 pieces per hour can be coated, depending upon article size and job conditions.

of painting your product AUTOMATICALLY

Would you like to switch to automation? A test production run in the DeVilbiss research laboratory can answer two big questions for you: (1) Is it practical for you to paint your products with fully automatic equipment? (2) How much will it cost?

For every manufacturer, the changeover from manual or semi-automatic painting to *fully automatic* painting is a major step.

And usually there's only one way to be *sure* if it's the *right* step: by an actual test run on already-installed equipment. For only then, ordinarily, is it possible to tell if automatic painting is practical — or even possible — on a production basis.

That's why many manufacturers are having us schedule trial production runs in our fully equipped research laboratory. For we can determine *in advance* whether or not painting your product automatically is practical or economical. Here's what we do:

Using your unpainted product, or a component part — together with your painting or coating specifications — we run a test on the standard automatic machine best suited to your product. This test duplicates, in every possible way, the actual conditions in your shop. When completed, the results of the test run are passed along to you.

Thus, you know ahead of time — before making any equipment purchases or shop

modifications — if it will pay you to paint automatically. You know the most economical production rate, the amount of paint or other coating necessary to do the job properly, the exact type of machine best suited to do the job.

We'd be happy to work with you on such a test. Write us, in detail, describing your product or component, type or kind of coating applied, number of coats, and production rate desired. Address your letter to: The DeVilbiss Company, Dept. 318I, Toledo 1, Ohio.

THE DEVILBISS COMPANY

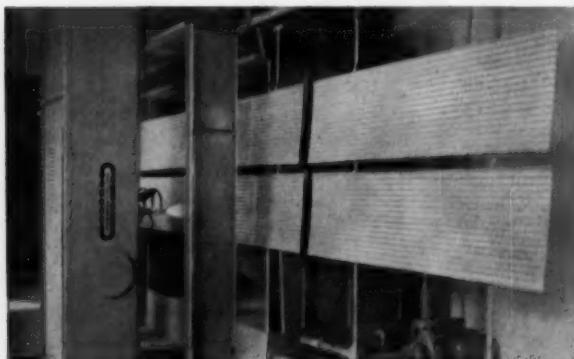
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FOR BETTER SERVICE, BUY

DEVILBISS

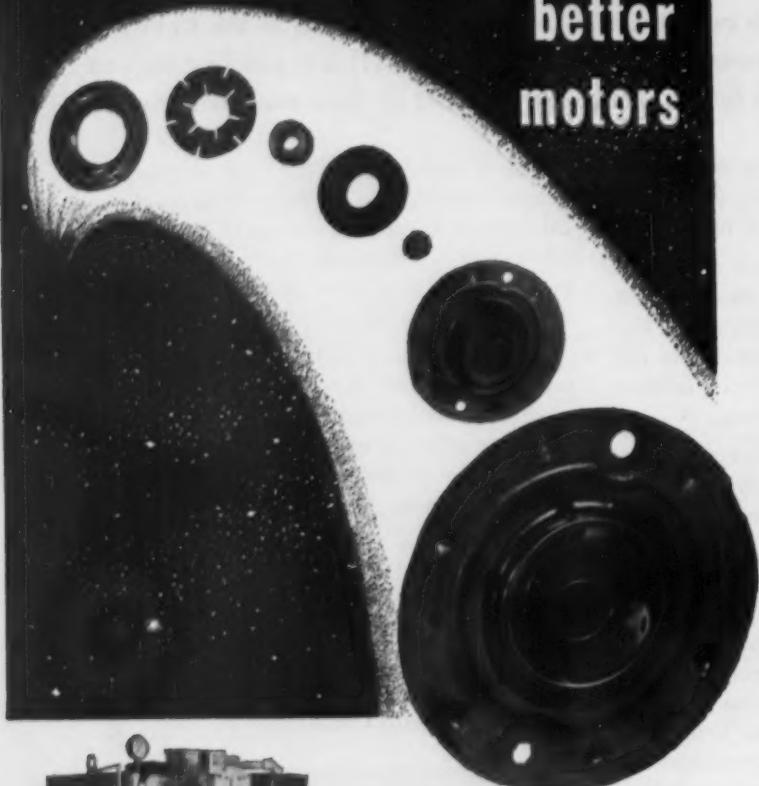


Parts traveling on overhead conveyors, such as these corrugated panels, can be quickly coated, front and back, on DeVilbiss Automatic Vertical Transverse Machines. These machines can even be adapted to paint boxcars automatically.



DeVilbiss Automatic Rotary Machines spray a great variety of products economically and quickly, with absolute uniformity — at production rates from 650 to 5,000 pieces per hour. The operator need only load and unload the table conveyor.

How Federal Welders help build better motors



To get more efficient assembly of an end head on a fractional horsepower motor, a leading automotive parts manufacturer came to Federal. The result — a standard Federal Bench Type Projection Welder with a special 8 station dial feed operated through a Geneva motion drive that completes 1600 assemblies per hour.

Federal uses a Reeves drive arrangement operating through a gear box to permit flexibility of adjustment of indexing rate. The die slide is spring loaded to insure identical weld force at each station. The manufacturer finds this welder gives a more uniform motor end head, in greater quantities, at reduced costs.

This is another example of how Federal's resistance welding "know how" is paying dividends to one of America's leading industrial concerns. Why not, when next you're considering welding, call Federal — First in Resistance Welding.

Federal
WELDERS

Warco
PRESSES

THE FEDERAL MACHINE & WELDER COMPANY

WARREN, OHIO

New Films:

"Power On The Pole," 16mm, sound-color, running time 8 minutes. Shows how autowatch capacitor equipment can be installed on a rural feeder line to correct periodic voltage drops. General Electric Co., Schenectady 5, N. Y.

"Flaw Location With Dye Penetrants," is a 23 minute, 16mm, sound-color movie. Intended for training purposes, it visually demonstrates every aspect of dye penetrant inspection from laboratory to production line. Turco Products, Inc., 6135 South Central Ave., Los Angeles 1.

Previews of a new sound film, *"Press Shop Maintenance,"* have aroused the interest of shop maintenance officials and training supervisors. The 20-minute color movie, produced by E. W. Bliss Co. of Canton, Ohio, should prove valuable in press shop maintenance training.

Rated as one of its most useful sequences is that showing how to assemble a new press and check all adjustments. Lubricating systems for various type presses are described. The film shows how to adjust for wear and check for clearance, and how to replace wear parts in clutches and brakes. Regular and periodic maintenance jobs are carefully described. For bookings, write to the E. W. Bliss Co., Canton, Ohio.

"Before Hydraulic Fires Start," 16 mm, black and white, sound. Running time 12 minutes. Describes use of Pydraul F-9, a fire-resistant hydraulic fluid and shows how increased use of hydraulic equipment is possible through use of fire-resistant hydraulic fluids. Monsanto Chemical Co., 1700 South Second St., St. Louis 4.

"Industrial Axial Flow Fans," 16 mm, color, sound. Running time 12½ minutes. Describes types of axial flow fans, characteristics, methods of testing. Aerovent Fan Co., Inc., 749 East Ash St., Piqua, Ohio.

COMPLETE Finishing SYSTEMS

... for ENAMELS • LACQUER • PAINT • VARNISH

Interior of Mahon Pressurized Tack-Off Enclosure at entrance to Finish Coat Spray Booths. Spray Booth is visible in rear.

Mahan Dry-Sump, Down-Draft, Hydro-Filter Spray Booth with Remote Sludge Tank and Automatic Sludge Unloader.

... the EXPERIENCE that goes
into the PLANNING and ENGINEERING
of MAHON EQUIPMENT is the item of
GREATEST VALUE to YOU!

Over four thousand five hundred feet of conveyor carries automobile bodies through the various finishing operations in this Complete Mahon Single Production Line Finishing System.

Mahan Down-Draft Deadener Booth. Clean Filtered Air is supplied from above—fumes are drawn down and out at bottom.



Mahan Dry-Off Oven with Cooling Tunnel at Exit End. Finish Baking Ovens are Similar with Multiple Controlled Heat Zones.

WHY Do So MANY Manufacturers BUY Complete MAHON FINISHING SYSTEMS?

The answer to that question is very simple. In the first place, they want Mahon KNOW-HOW. In the second place, they want their entire finishing system planned, coordinated, engineered and installed by one responsible organization. In other words, they want one responsibility for final results—which are the quality and the cost of the finish on a product. Many things enter into these two end result items . . . most important are the operating efficiency and the operating cost of the finishing equipment. Most manufacturers have found that this is where the true worth of Mahon equipment shows up . . . it isn't built to a price, it is built to do a job. If you have a finishing problem, or are considering new finishing equipment, you, like thousands of other manufacturers, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. You will find also, that Mahon equipment is built better for more economical operation over a longer period of time—a factor to be weighed carefully when comparing initial cost figures. Mahon will do your complete job on one contract . . . undivided responsibility for the entire system insures proper coordination and safeguards you against complications which can upset your production schedules. See Mahon's Insert in Sweet's Plant Engineering File for information, or write for Catalog A-655.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 34, Mich.

• WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems and Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

Research:

Powerful x-ray machine cuts exposure time.

One of the most powerful crystallographic X-ray machines ever designed has recently been placed in operation at the Westinghouse Research Laboratories. The new machine will permit a six-fold re-

duction in exposure time for X-ray photographs, and yields types of radiations not obtainable with ordinary X-ray equipment.

The new X-ray machine will be used for fundamental research. Its power, speed, and flexibility make it an ideal instrument for investigating such basic problems of matter as the influence of atomic arrangement on magnetism, the

mechanisms of metallurgical reactions, and the effects of temperature on the atomic architecture of crystals.

Narrow, Intense Beam

Heart of the new apparatus is a radically improved type of crystallographic X-ray tube which yields a narrow, intense beam of X-rays. Directing the beam through a crystalline material and allowing the rays to then fall on a photographic film gives a pattern that tells the arrangement of atoms in the crystal.

The usual X-ray tube for this purpose yields X-rays activated by a continuous current of 15 or 20 milliamperes at 45,000 v. The X-rays in the new tube result from a continuous current of 120 milliamperes at 45,000 v—at least six times as much current and power.

High power output of the tube comes from a unique, water-cooled rotating metal anode, or positively charged electrode. This anode, about 5 in. in diam, resembles a hollow metal wheel and rotates about 1000 rpm.

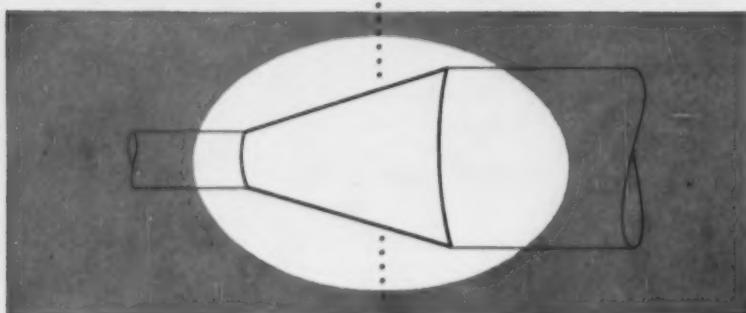
X-rays are generated when a stream of electrons from a special type of cathode, or negatively charged electrode, smash head on into the rim of the whirling anode. Cooling water is pumped through a cavity in the anode.

A Cool Fresh Surface

The high power output of the tube is possible because the whirling anode always presents a cool, fresh surface to the electron stream. At such power a stationary anode, even if water cooled, would soon vaporize under the terrific heat generated by impact of the electrons on their target.

When bombarded with electrons, different metals give rise to different kinds of X-rays. The new X-ray tube is provided with extra anodes, each plated with a different metal. These anodes can be interchanged within a few minutes, thereby providing a variety of X-rays which can be selected by the research scientist with speed and ease.

TITUSVILLE FORGED PIPE REDUCERS



Meet All Requirements for Industrial Piping Systems

Bench machined to your most exacting requirements—Titusville Forge pipe reducers can be furnished in carbon or alloy steel—for every industrial piping system. Bevels are machined to special sizes for welding. Hollow bored pipe and fittings also can be supplied in carbon, stainless steel or other alloys.

Latest manufacturing techniques and newest cost-saving methods are employed at Titusville Forge. Our long years of experience, modern fabricating facilities and special knowledge of design are your assurance of dependability in forgings to meet your requirements.



STRUTHERS WELLS CORPORATION

TITUSVILLE FORGE DIVISION

TITUSVILLE, PA.

PLANTS AT TITUSVILLE, PA., and WARREN, PA.

Offices in Principal Cities

Struthers
Wells



Better luster, savings in time and money are reported by Lufkin Rule Co. as a result of switching to BURNEK 22. Above,

barrel is emptied after burnishing operation. Lufkin also uses Wyandotte 444-C, brush-on paint stripper, to salvage steel tape.

How to get brilliant luster at lowest cost

Use Wyandotte's Burnek 22, says Lufkin Rule Co.,
Saginaw, Mich. Here's why:

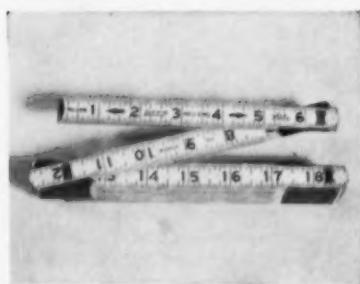
A continuous search. The Lufkin Rule Company burnishes all brass spring joints on its rulers before their final assembly. In a continuous effort to improve the results of the finishing operation, the company had tried a wide range of burnishing compounds, including soap chips, but without sufficient success to meet their standard of quality. Recently they switched to Wyandotte's BURNEK 22.

Change for the better. "BURNEK 22 gives us better luster than we've been able to get with any other product," says Divisional Superintendent J. H. Farmer. "And it dissolves completely . . . faster. Rinsability? Excellent! It's easy to get really clean parts with BURNEK 22."

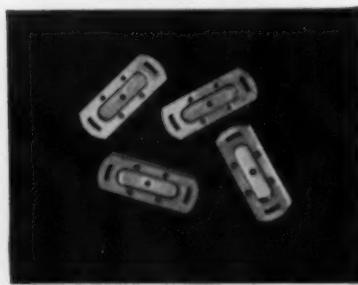
Burnishing costs have been substantially cut at Lufkin Rule because, they report, BURNEK 22's easy rinsing and solubility have

saved time and money. They use less water for rinsing. And a little BURNEK 22 goes a long way!

A call that will pay. If you're looking for ways to improve your metal cleaning or finishing operations, call your Wyandotte representative today. Wyandotte products are research-developed and production-proven to give you the best results . . . at lowest use-cost. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, Calif. Offices in principal cities.*



Here is a typical rule which has brass spring joints—made at Lufkin Rule Co.



These are the spring joints which are used on the rule pictured above. Note luster.



Wyandotte
CHEMICALS

J. B. FORD DIVISION

SPECIALISTS IN
METAL-CLEANING PRODUCTS

New Books:

"Manual of Lathe Operations." Revised edition of a standard shop handbook. Illustrates and describes in easy-to-understand language the care and operation of modern screw-cutting lathes. Gives latest technical data for machining new alloys and plastics, and new information on tool grinding, cutting speeds, lubricants. Atlas Press Co., 2367 North Pitcher St., Kalamazoo, Mich. \$1.50. 253 p.

"Home Wiring Handbook," fourth edition. Gives complete information on modern home wiring, from selection of electrical systems through installation. Consumer Service Dept., Westinghouse Electric Appliance Div., Mansfield, Ohio. \$1.00. 142 p.

"National Convention Transactions 1955." Ninth annual convention, American Society for Quality Control, Inc., Room 563, 50 Church St., New York 7. \$3.50. 740 p.

"Effect of Fine Particle Sizes on Sulfide Flotation," by A. P. Wichenmann and R. B. Bhappu. Dept. of Publication, Colorado School of Mines, Golden, Col. \$1.00.

"Everything and the Kitchen Sink." Tells how American industry during the past century has revolutionized the American way of living. The book is far more than a story of Richard Teller Crane and the Crane Co. It reflects, in hundreds of pictures, the changing American scene at home and at work during the past century. Farrar, Straus & Cudahy, Inc., 101 Fifth Ave., New York 3. \$4.00. 160 p.

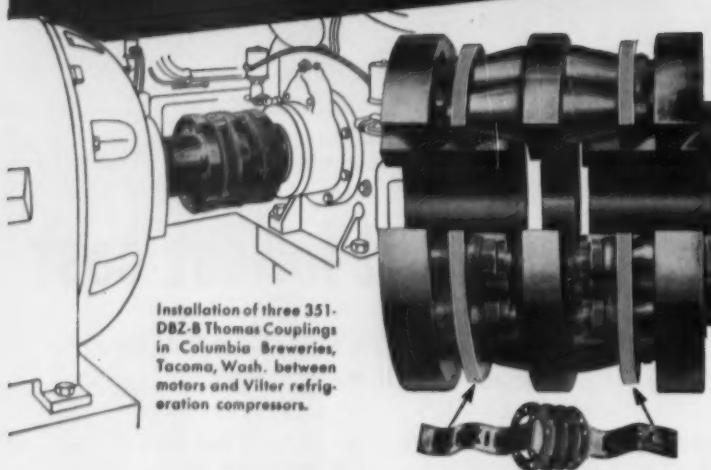
"Getting the Most from Research and Engineering," contains three papers on related subjects by industry experts. American Management Assn., 330 West 42nd St., New York 36. \$1.75 (\$1.00 to AMA members). 59 p.

"How A Company Can Develop Union Responsibility." An address by H. O. Eby, Labor Relations Director of the Pittsburgh Plate Glass Co., before CPMA and the Personnel section of the Western Management Assn. California Personnel Management Assn., Farm Credit Bldg., 2180 Milvia St., Berkeley 4, Calif. \$1.00. 10 p.

"Coordination, Control and Financing of Industrial Research," A. H. Rubenstein, editor. Proceedings of the Fifth Annual Conference on Industrial Research held in 1954, with selected papers from the Fourth Conference held in 1953. King's Crown Press, Columbia University, 2960 Broadway, New York 27. \$8.50. 424 p.

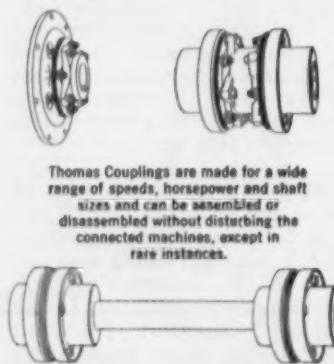
"Foremen and Supervisors On The Management Team." A panel report of what happens when management skills are entrusted to foreman and supervisors. California Personnel Management Assn., Farm Credit Bldg., 2180 Milvia St., Berkeley 4, Calif. \$1.00. 12 p.

THOMAS FLEXIBLE COUPLINGS... for more years of better service!



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Write for our new Engineering Catalog No. 51A

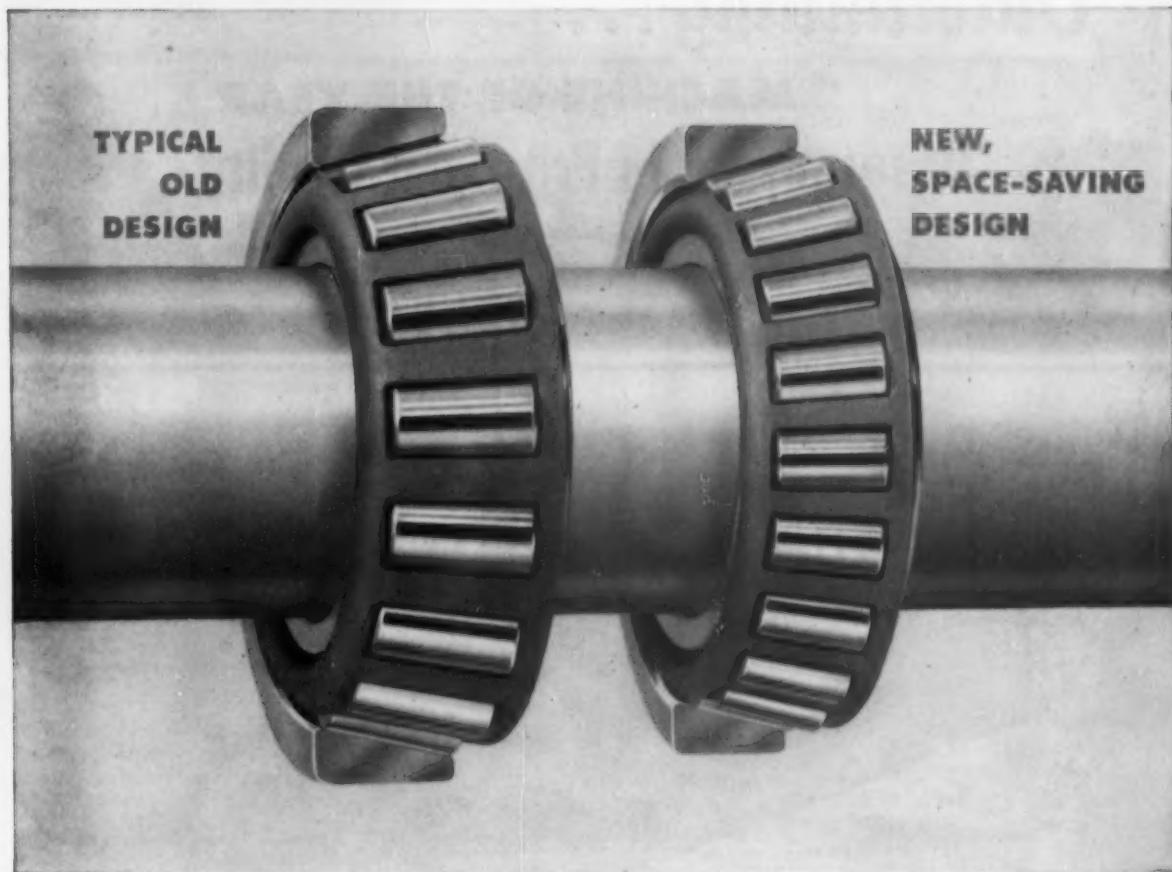
THOMAS FLEXIBLE COUPLING COMPANY

Largest Exclusive Coupling Manufacturer in the World

WARREN, PENNSYLVANIA, U.S.A.



New capacity-packed TIMKEN® bearings save space and weight, cost less than previous bearings of same bore sizes



HERE'S big cost-saving news if you use bearings in $\frac{3}{8}$ ", $1\frac{1}{4}$ " or $1\frac{3}{8}$ " bore sizes.

The Timken Company has designed three new tapered roller bearings that take up less space, weigh less than previous bearing designs and cost less! They're packed with capacity, too — no bearings have ever delivered so much capacity in so little space.

If you now use tapered roller bearings of these bore sizes you can

enjoy big savings two ways by redesigning for the new Timken® bearings: savings in bearing cost and, because the bearings are smaller, savings in related parts.

The new Timken bearings also make it possible for you to enjoy the advantages of tapered roller bearings in many additional applications—and at minimum cost.

In less than a year, industry has already designed well over 1,000,000 of the new Timken bearings into

its products. Why not re-examine your bearing applications today to see if you, too, can reduce the manufacturing cost of your products, or improve their performance, or both, by adopting the new low-cost Timken bearings. Bearings and all auxiliary parts are immediately available. Write: The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN ... your number 1 bearing **VALUE**

TIM-O-MAX REG. U. S. PAT. OFF
TAPERED ROLLER BEARINGS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

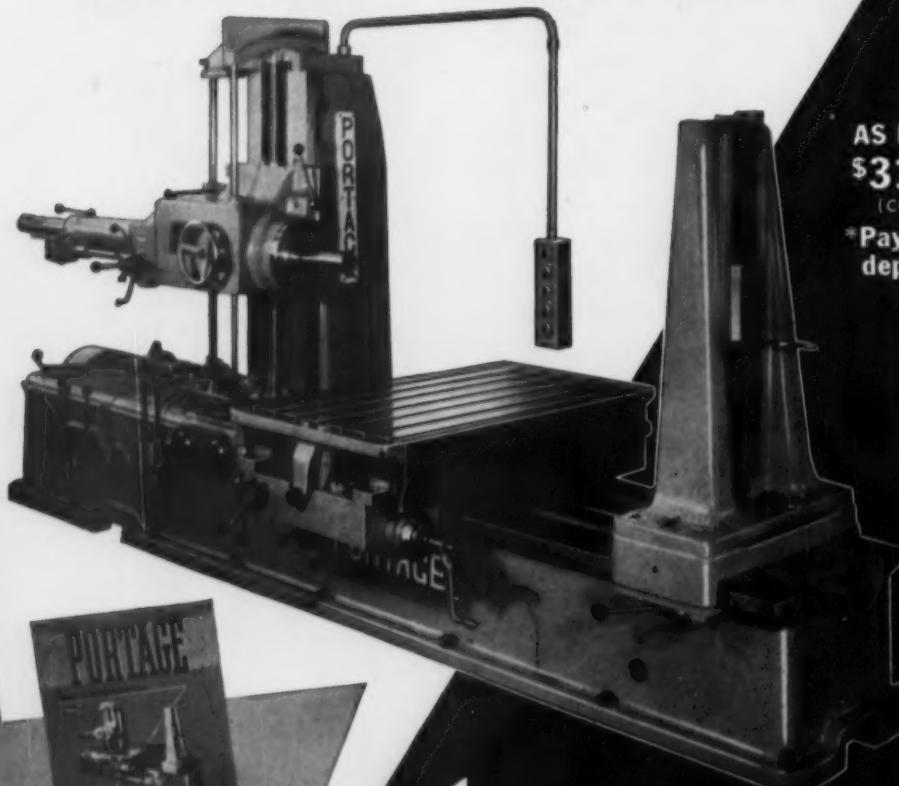


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(4" Diameter Spindle)

Horizontal Boring, Drilling & Milling Machine Outstanding . . .

MACHINE OF THE YEAR
Unsurpassed in Price and Quality



AS LOW AS
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(COMPLETE)

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depreciate
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today

The PORTAGE Boring, Drilling & Milling Machine offers a real saving in new machine investment. PORTAGE mills cost from 5% to 20% LESS than present comparable makes . . . and the amazing part of this savings is the machine itself . . . Write today for literature covering all the specifications and features on the PORTAGE Mill.

* For full particulars, phone the factory today!

THE PORTAGE MACHINE CO.

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BUILDERS OF PRECISION MACHINE TOOLS, SPECIAL AND PRODUCTION MACHINERY SINCE 1916

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 121 or 122

Small machine for jigless boring production parts

Jigless boring production parts and the machining of jigs, fixtures and experimental parts can be done on a new smaller size Jigmil. The Model 2B-36 Spiramatic Jigmil will have a 2½ in. diam spindle bar with No. 40 NMTB taper, 12 in. bar feed, 24 x 36 in. table, 36-in. horizontal travel and 24-in. vertical travel. The machine is equipped with automatic position-

ing to horizontal and vertical slides; power operated tool lock mechanism and a completely new type of index table for jigless boring of repetitive parts where it is necessary to accurately bore a workpiece from two or more sides. The Spiramatic Jigmil will be introduced at the Machine Tool Show. *DeVlieg Machine Co.*

For more data circle No. 37 on postcard, p. 121.



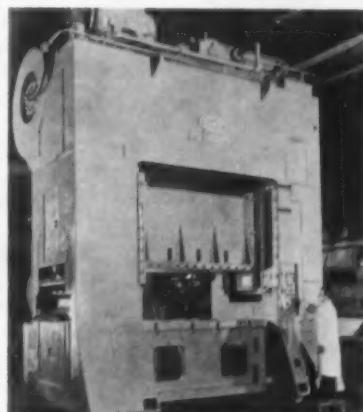
Feed accessories completely enclosed in press

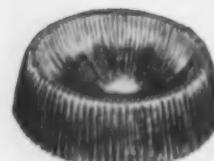
To speed operation, eliminate hazards and to boost production efficiency, new 300-ton capacity Auto-feed press has been designed with all controls, the automatic feed device and the scrap cutter as an integral part of the unit. This internal integration of all controls and accessories makes the press a complete production unit, ready for immediate operation as soon as it is set into position. Control panels are conveniently located in the

press uprights and are protected against damage. Hinged doors and panels provide quick access to all accessories for periodic servicing. The press includes standard features such as automatic oil lubrication and automatic oil pressure safety switches. Several Danly presses and accessories will be displayed at the Machine Tool Show. *Danly Machine Specialties, Inc.*

For more data circle No. 38 on postcard, p. 121.

Turn Page





A CHALLENGE!

THE STRONGEST MADE BY
ANY GALVANIZED SHEET:

*Anything that
can be made of steel sheets
can be made of*

WHEELING
sofTITE[®]

galvanized sheets!

If you've been having difficulty fabricating galvanized sheets, try Wheeling sofTITE Galvanized Sheets.

Here are sheets you can work to the limits of the base metal . . . so ductile, so tight-coated, you can use them for anything you make of steel sheets.

Bead it, draw it, seam it . . . you name the operation . . . Wheeling sofTITE will take it and come back for more . . . with never a trace of chipping or flaking of

coating. And for good reason—sofTITE has the tightest zinc coating yet produced.

Put sofTITE to the test. See for yourself why the demand for sofTITE has forced Wheeling to triple its production facilities in 1955.

*Galvanized steel does it better
... sofTITE does it best!*

For full information, call or write the Wheeling sales office nearest you.

District Sales Offices: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco
WHEELING STEEL CORPORATION, WHEELING, WEST VIRGINIA

IT'S WHEELING STEEL





Tracer lathe has no chip problem

New lathe featuring a top tracer will be performing production turning on automotive forgings at the Machine Tool Show. A standard automatic chip removal unit will be used to remove chips through the opening provided in the rear of the lathe bed. This unit plus the full width, full depth chip chute shows that even with its high rate of metal removal, chips are no prob-

lem on the Hydra-Feed tracer lathe. Location of tracer slide and template on top carriage eliminates possibility of dirt or chips interfering with maximum lathe efficiency. The lathe equipped with an auxiliary carriage can perform additional facing, grooving and chamfering operations. *Hydra-Feed Machine Tool Corp.*

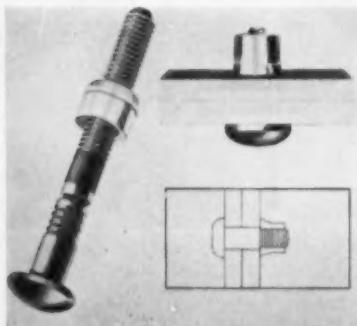
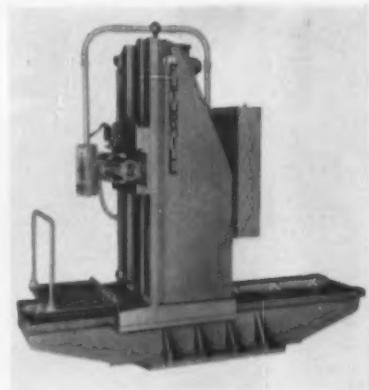
For more data circle No. 40 on postcard, p. 121.

Mills ends of structural beams and girders

This floor type milling machine, engineered for milling the ends of structural beams and girders, has a vertical range of 77 in. and a horizontal range of 108 in. The horizontal range can be increased by lengthening the bed. To eliminate vibration for the carbide milling of thin sectioned H or I beams at high feed rates, all spindle gears have been done away with. The GE powered motorized milling head runs at 1200 rpm giving 1200 sfm

with a 4-in. cutter and 900 sfm with a 3-in. cutter. Four feed rates of 40, 60, 80 and 120 ipm are provided for both vertical and horizontal movement. Safety features prevent accidents, tool breakage, or motor failure. Rotating or tilting bases are offered as auxiliary equipment. Design centers around the use of Futurmill solid carbide indexable milling cutters requiring no resharpening. *Futurmill, Inc.*

For more data circle No. 41 on postcard, p. 121.



Commercial lockbolt replaces rivets, bolts

New commercial lockbolt is designed for such typical applications as bus, trailer and truck bodies, building construction, machinery and equipment, and railroad cars. It replaces rivets, bolts and other fasteners for greater speed and uniformity. In using the fastener, the locking collar is placed over the projecting pin tail and a gun is ap-

plied to pull the work together and swage the collar into the locking grooves on the pin. Pin is broken at the breakneck groove and the pin tail is automatically ejected. Advantages: increased production, lower installation costs, positive locking action, strong joints, high resistance to fatigue. *Townsend Co.*

For more data circle No. 42 on postcard, p. 121.

C-Presses offer choice of control valve assemblies

Features of the new C-Press line which will be shown at the Machine Tool Show include a high-speed differential circuit and inching control which allow the press operator to literally inch the ram downward or upward while setting dies. The open C-gap frame eliminates encumbrances within the tooling area and provides a maximum amount of room for tooling. The 60-sec ram stroke adjustment is conveniently located away from the tooling area.

Sturdy, self-enclosed frame design features compact power units which can be easily removed. H-P-M relief valves provide an infinite range of tonnage regulation on all models. Index tables may be used with the C-presses as a workholder carrying parts or material to a central work station, or as a carrier with dies installed at each station of the table. *Hydraulic Press Mfg. Co.*

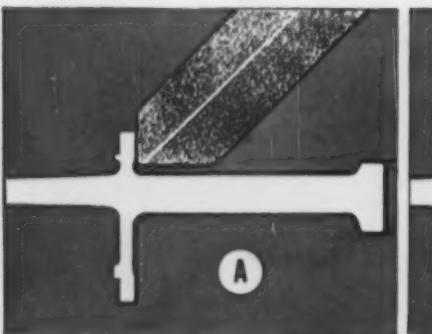
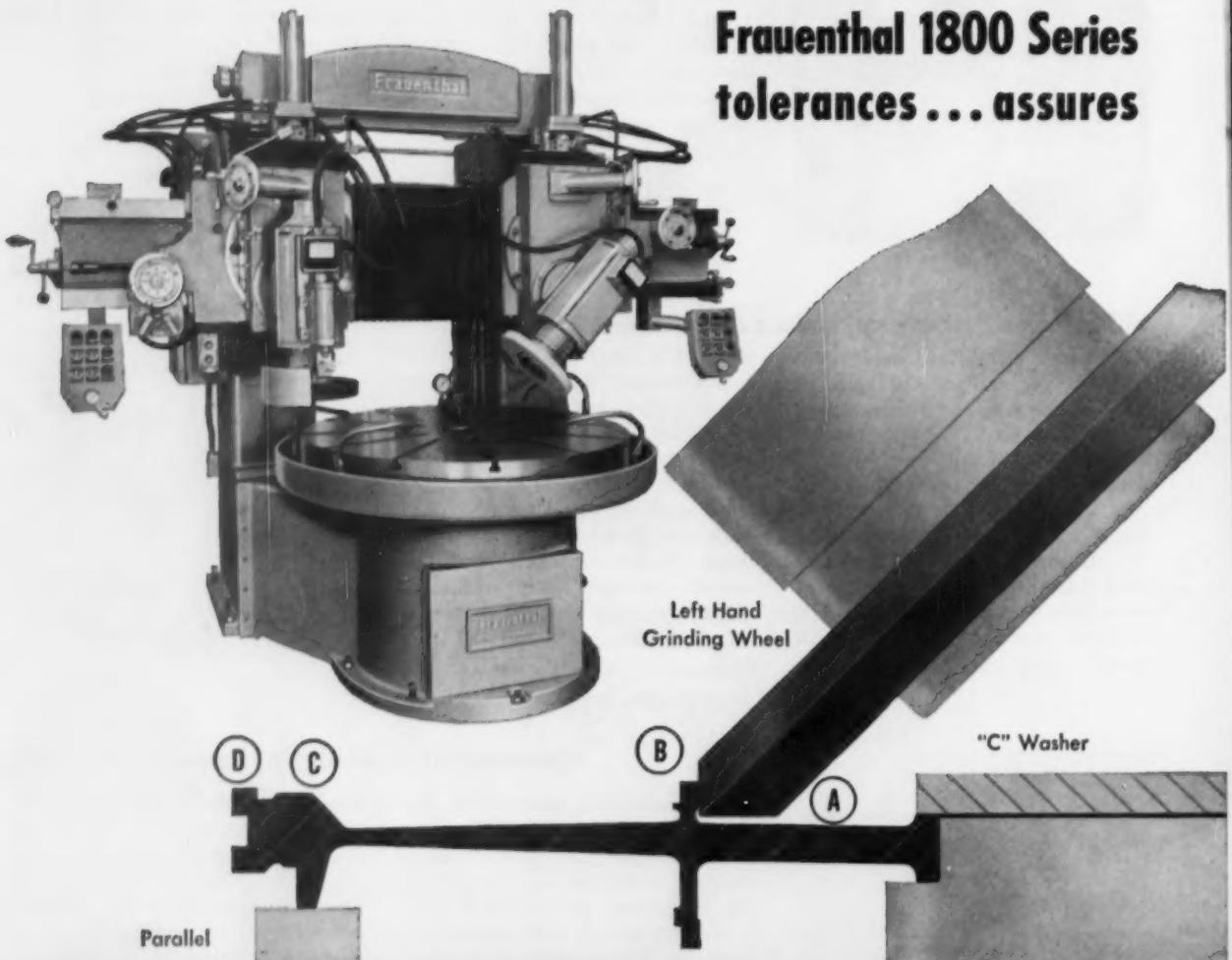
For more data circle No. 43 on postcard, p. 121.

Turn to Page 148

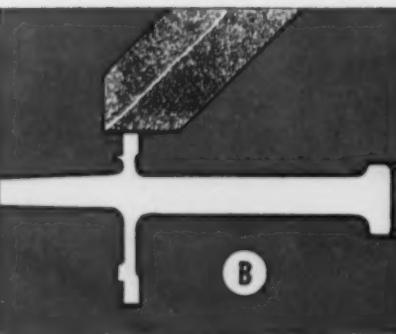


Multiple Grinding Operations

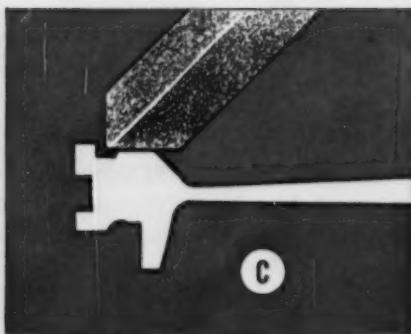
Frauenthal 1800 Series
tolerances . . . assures



Jet engine part is set up on steel
parallels and securely clamped to
center pilot with large "C" washer.



Rigid mounting and proper alignment
assures a high degree of accuracy in
parallelism and roundness. Left hand



grinding wheel grinds one diameter
and three related surfaces to extremely close tolerances.

Frauenthal Division

in One Set-Up

Double Head machine finish grinds 6 surfaces to close concentricity of related surfaces...reduces grinding costs

AS ILLUSTRATED in the schematic diagrams, three different diameters and three related surfaces of a jet engine component are precision-ground square and concentric with one another in a single setup using two grinding heads. This is a typical example of how a Frauenthal 1800 Series Double Head Grinder cuts grinding costs.

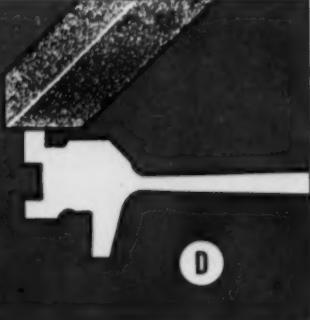
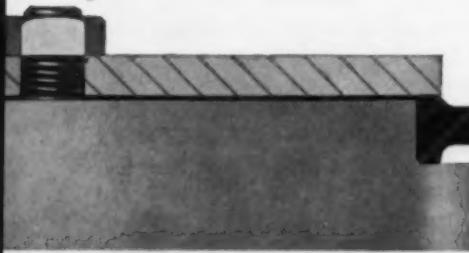
Frauenthal 1800 Series Grinders are available with four standard table sizes — 36", 42", 48" and 52" dia. with 60" maximum swing. Specially engineered operating features or job accessories can be included to fit your requirements.

With Frauenthal Grinders (1800 Series or 2200 Series) you're able to grind a number of related surfaces (up to 140" dia.) without changing setup of workpiece, and obtain accuracies within .000200". This assures you consistently uniform precision in concentricity, parallelism and roundness.

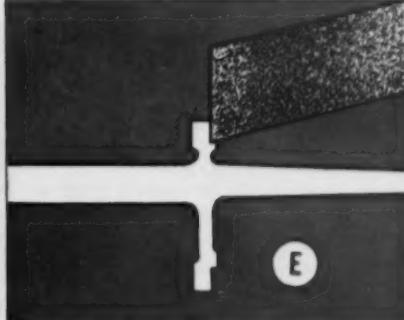
For complete details, contact Frauenthal of Muskegon.

Free Catalog!

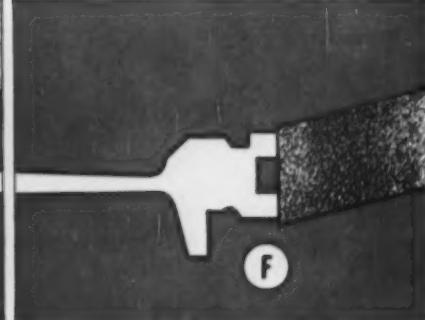
For complete details on Frauenthal 1800 Series Double Head Grinders, write for catalog.



Starting from center of workpiece it finish grinds INNER diameter "A", and TOP FACES "B", "C" and



"D". Right hand grinding wheel finishes OUTER diameters "E" and "F". Both spindles are swiveled for access



bility to the workpiece surfaces. All surfaces of jet engine part are ground within .000200".



Right Hand
Grinding Wheel



E

F

**THE KAYDON ENGINEERING CORP.
MUSKEGON, MICHIGAN**

NEW EQUIPMENT

HAVE YOU A PUMP PROBLEM?

Illustrated is a **Storm-Vulcan 575 Camshaft Grinder** on which **Ruthman Gusher Coolant Pump** is standard equipment.

Ruthman CAN SOLVE IT FOR YOU

If you have a centrifugal pump problem, we can help you solve it. As originators of the motor driven machine tool coolant pump, Ruthman has developed many types of centrifugal pump applications including coolant pumps, agitators, molten metal pumps, etc. Send us complete information on your pump requirements, perhaps one of our many models with slight modification will solve your specific problem.

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Setting machinery?

use non-shrink
EMBEKO GROUT

NOW READY-TO-USE



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Whether it's a rolling mill, hydraulic press, planer, lathe, shaper or other type of steel mill or metal working equipment, Embeco Pre-Mixed Grout will give you lasting results.

Embeco Pre-Mixed Grout produces a flowable grout that is non-shrink...insures full bedplate contact...maintains alignment...has high impact-resistance.

Recommended by leading equipment manufacturers everywhere. **EMBEKO PRE-MIXED GROUT IS READY TO USE**—you add only water. Write for 8 page illustrated booklet.

Creators and Manufacturers of Products to Improve Concrete and Mortar

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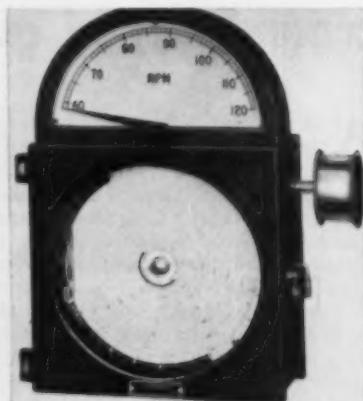
CLEVELAND 2, OHIO

Subsidiary of American Mortar Company

TORONTO 15, ONTARIO

Keeps production record

New indicating and recording tachometer increases operating efficiency, cuts production costs. It automatically records the operation

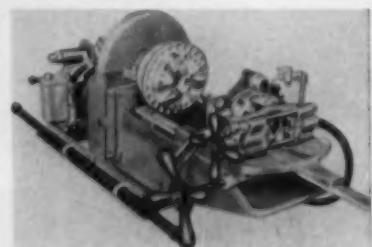


of the machine on which it is installed. Shows speed and rate of production and every change in speed. Also shows starting and stopping times, slowdowns, and non-productive periods, time and duration of each, and the actual production and idle time. *Amthor Testing Instrument Co., Inc.*

For more data circle No. 44 on postcard, p. 121.

Increased production

Improved Model-A pipe and bolt threading machine has increased productivity of 40 pct. This high speed machine threads 2-in. pipe in



10 sec; 1/2-in. pipe in 3 sec. A power grip wrenchless chuck further reduces the time required for chucking, compared to former wrench type chucks. Use of power grip chuck also increases safety of machine operation. *Beaver Pipe Tools, Inc.*

For more data circle No. 45 on postcard, p. 121.

Turn Page

THE IRON AGE

World's tallest pile driver...
World's toughest test rig...
for
Elastic Stop® nuts



Each hammer-stroke of this 270-foot pile driver delivers a 24-foot-ton wallop! It was built by Raymond Concrete Pile Company to drive 200-foot pipe piles for the foundation of units being added to the B. C. Cobb Steam Plant of Consumers Power Company, at Muskegon, Mich.

Raymond makes a practice of using Elastic Stop® nuts for bolting together sections of leads and booms on all their pile-driving equipment. The red elastic locking collar of these vibration-proof fasteners has successfully maintained its grip under these severest of all vibration and impact conditions!

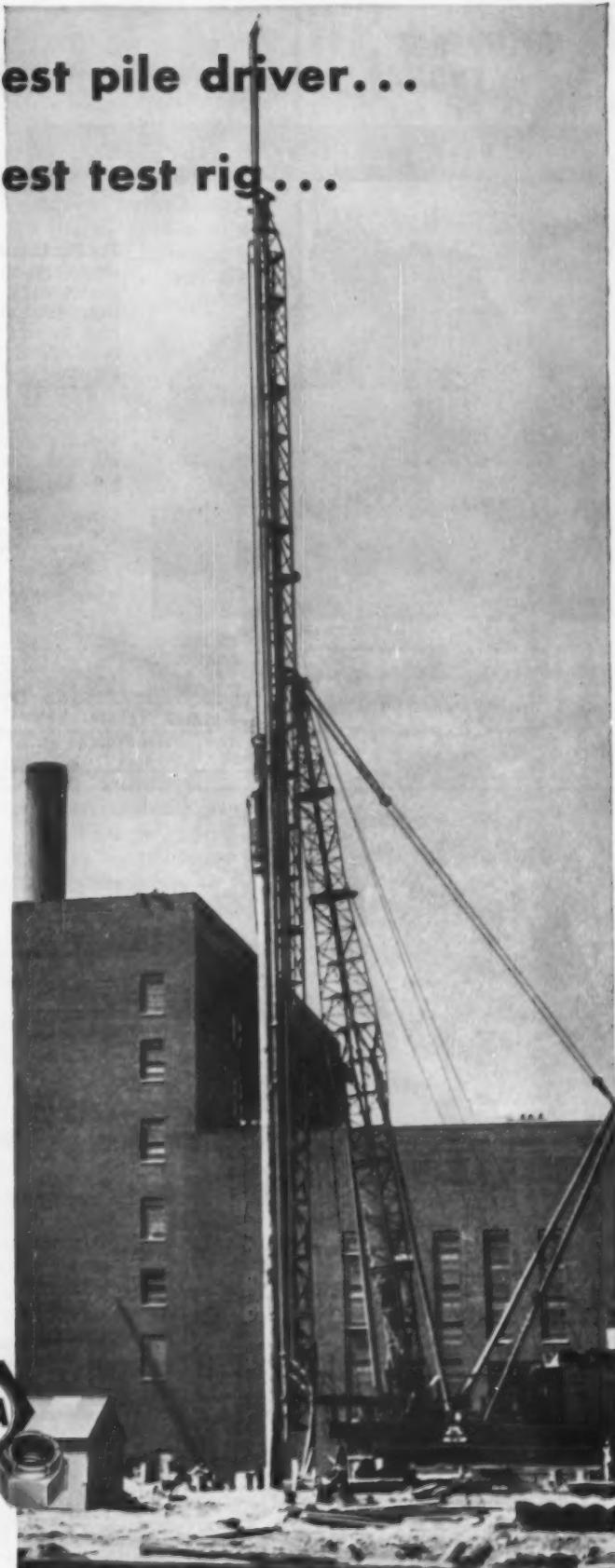
Whether used on aircraft or locomotives; guided missiles or steam shovels . . . more than twenty years of field testing on applications where safety and severe operating conditions demand a fastener that will not shake loose, prove that . . . *you can rely on Elastic Stop nuts.*

**ELASTIC STOP NUT CORPORATION
OF AMERICA**

Department H77-777 • 2330 Vauxhall Road • Union, N. J.

The red locking insert in an
Elastic Stop nut guarantees

- **reusability**
- **vibration-proof locking**
- **thread sealing . . . no galling**
- **immediate identification**
- **adaptability to all shapes and sizes of threaded fittings**
- **suitability to production line assembly methods**



*the trend is
to THOMAS*

double angle shears



The inbuilt quality and ruggedness of Thomas double angle shears insure years of trouble free service with a minimum of maintenance.

If you have a need for "high production" shearing of angles it will pay you to investigate Thomas.

Sizes are built for angles up to 8x8x11/4", with or without turn-table.

WRITE FOR BULLETIN 310-A

**Punches • Shears • Presses
Spacing Tables • Benders**

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.



Everyone recognizes this
as a sign of summer...

And smart gear users know
this  is the sign of good gears
made to your specifications.

May We Send You Our Brochure?



"Gears...Good Gears Only"

THE CINCINNATI GEAR CO. • CINCINNATI 27, OHIO

NEW EQUIPMENT

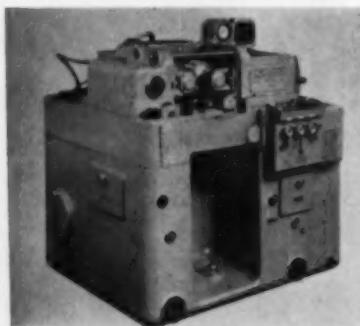
Lubricated plug valve

New lubricated plug valve for 200 lb oil-water-gas, or 150 lb steam working pressure affords positive high pressure distribution of lubricant over the entire sealing surface; a self-freeing plug to prevent sticking; and the ease of operation of a cylindrical plug valve. Its closely fitted plug and body prevent seepage of lubricant into line fluids, and assure longer valve life. Triple stem seal; double ball and lubricant sealed check valve system; and its teflon floated plug for extra ease of operation and low maintenance are other features. Valve is available in wide choice of metals and sizes in 100 pct pipe area and venturi types. *Homestead Valve Mfg. Co.*

For more data circle No. 46 on postcard, p. 121.

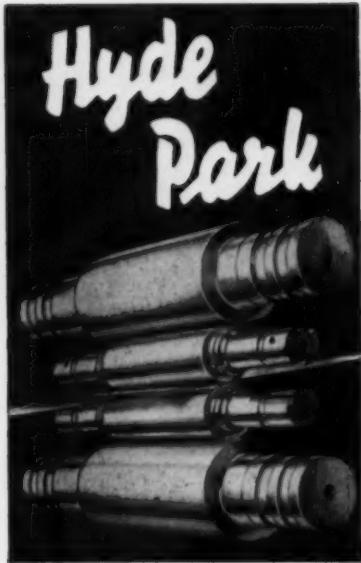
Form generating machine

Built to American and British standards, a new form generating machine is designed for deep rolling of such forms as Acme threads, large diameter coarse pitch worms, gear teeth, splines, rod lengths of various thread forms as also for burnishing. Strength of the forms resulting from the Steinle rolling



process is claimed to be up to 30 pct higher than that produced by cutting or grinding. High speed production and accuracy are also claimed for these machines which are hydraulically operated. Rate of rolling is controlled to suit the material being rolled. Capacity is 3/16 to 3 in. diam; thread lengths up to 6 1/4 in. by plunge rolling; length unlimited by through rolling. *Steinle Machine Co.*

For more data circle No. 47 on postcard, p. 121.



Red Circle Rolls for all Purposes

The Red Circle on the Roll is the Hyde Park mark of Quality. Hyde Park makes rolls for every type mill.

Chilled Rolls

Alloy Iron Rolls

Moly Rolls

Nickel Chilled Rolls

Grain Rolls

Cold Rolls

Sand Rolls

for
Finer Finish, Longer Life
and Greater Tonnage
specify Red Circle

Hyde Park

FOUNDRY & MACHINE CO.

Hyde Park, Westmoreland County, Pa.

ROLLS • ROLLING MILL MACHINERY
GREY IRON CASTINGS



July 14, 1955

NEW EQUIPMENT

Sliding head drills

New 16-in. sliding head bench, floor and multiple spindle drilling machines have every important element built-in and conveniently located for operator comfort and pleasing appearance. Drills are shipped complete with motor and controls; are ready to operate as soon as power leads are connected



to factory installed electrical controls built into the head. Drills may be ordered with geared power feed, for easier drilling and higher production. Direct-reading depth dial may be set to disengage feed automatically. Spindle is full-floating, mounted in precision, sealed, lifetime lubricated ball bearings. Drills are rated at 1 in. in cast iron. They will be on display at Machine Tool Show. Cincinnati Lathe & Tool Co.

For more data circle No. 48 on postcard, p. 121.

Throw-away blanks

New line of throw-away blanks, both precision and utility, and additional on-end types of the new steel cutting grades 350 and 370 carbides as well as of standard grades for nonferrous machining is announced. The line covers all ranges of machining from light finishing to extreme heavy roughing. Blanks are ready-for-use on standard mechanical tool holders. Nine basic sizes with different radii in triangular, round and square shapes are available. Carboloy Dept. General Electric Co.

For more data circle No. 49 on postcard, p. 121.
Turn Page

**"WE SAVE 90¢
Every Time We
Find a
Cracked
Forging"**



"Each of these forged push rods used in light engines costs \$1.16 to make. Of this, 21¢ goes into rough forging, 95¢ into processing and finishing. By finding cracks in the rough forging stage, we save this 95¢ less a cleaning, segregation, handling and inspection cost of 5¢ each. Multiply this saving by thousands of parts and you can see how much we save by inspection with Magnaflux*."

Savings don't stop here. By adding inspection with Magnaflux at the rough forging stage, this plant found that cracks were being "built in" during forging. By changing procedures, the forge shop was able to correct the causes of most cracks.

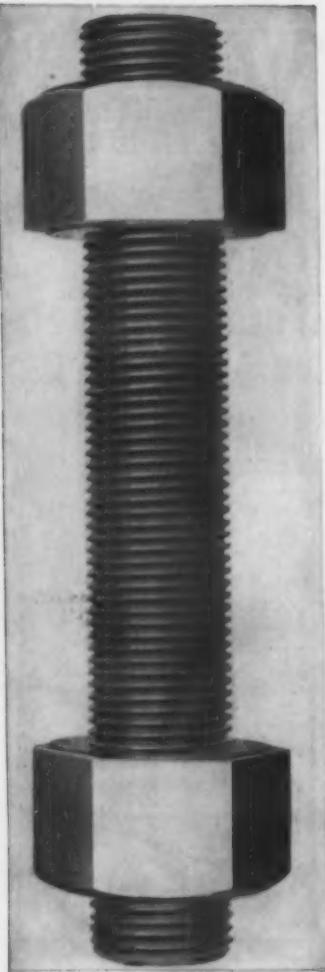
Inspection by Magnaflux' methods, used in this way as a manufacturing tool to cut costs, finds all cracks from any cause when they first occur. It saves much more than it costs... and is nondestructive and fast. Ask to have a Magnaflux engineer make a survey with you, and advise you of savings figures on an operation like yours. Or write for new booklet on LOWER MANUFACTURING COSTS.

*Magnaflux is a trademark of Magnaflux Corporation



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Cleveland 15 • Detroit 11
Dallas 19 • Los Angeles 58

MAGNAFLUX



**WHEN IT'S
Special BOLTS
and STUDS**

Send your Specifications to



40 years' experience in
making special bolts, studs,
nuts for specific job
requirements.



REPRESENTATION IN PRINCIPAL CITIES

NEW EQUIPMENT

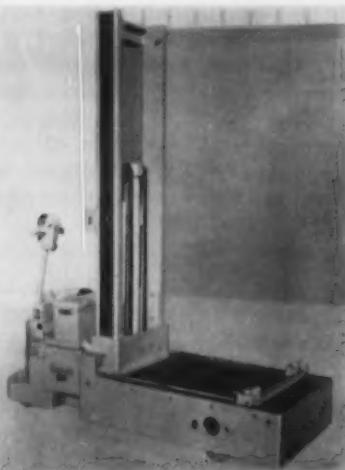
Seals all metals

New metal oxide type sealer is said to have an unusually short sealing reaction time for impregnating all types of metal castings. The seal, a vehicle carrying minerals and metal oxides, is said to effectively eliminate microscopic porosity in the castings. Can be used with all types of welding alloys to impregnate welded joints of fabricated parts. Recommended for use in advance of machining operations, the Porlox Seal is available in three types labeled A, B and C, differing only in size and quantity of oxide particles. *Preenco Products, Inc.*

For more data circle No. 58 on postcard, p. 121.

Die-handling units

Three standard high-lift die-handling units are designed to handle dies and templates into and out of metalworking presses and storage areas. The die handlers are available as part of the Transtacker line of equipment, in capacities of 3000, 4000 and 6000 lb, with standard



heights of 68 and 83 in. Flip over type die handling pins permit pushing the die off the platform with the faces of the pin block. Push-pull die handling pins are dual controlled by pushbutton station mounted on the uprights. Short platform lengths (maximum 48 in.) permit safe operation in narrow and congested aisles. *Automatic Transportation Co.*

For more data circle No. 51 on postcard, p. 121.

**NOW-Make
Your Own
Oxygen and
Nitrogen in
One Generator**

*... and Save
Up to 50%!*



With INDEPENDENT's newly-designed generators, you can make your own high-purity oxygen and nitrogen from the free air . . . and in the same generator.

You reduce costs up to 50% by eliminating handling costs . . . vaporizing costs . . . evaporation losses . . . residual losses . . . and transportation costs.

INDEPENDENT Generators are available in any capacity, any purity and any pressure. Put your oxygen-nitrogen problem up to us . . . our engineering department will gladly submit recommendations . . . no obligation, of course!

INDEPENDENT ENG. CO., Inc.

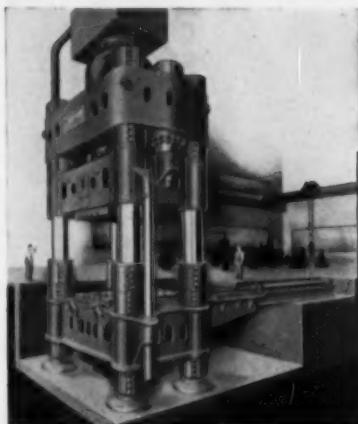


O'FALLOON 4, ILLINOIS

NEW EQUIPMENT

8000-ton forging press

The most advanced design principles are said to be incorporated into this new 8000-ton hydraulic forging press. Of downstroke, column type design, the press is accumulator-operated with 4500 psi water pressure and will be used for forging heavy aluminum billets. Working area between positive stops is



98 in. l to r and 58 in. f to b. Diameter of the main columns is 28 in. Stroke of the main and side rams is 72 in. while that of the ejector is 12 in. Maximum daylight opening is 110 in.; minimum, 38 in. Press speeds in ipm are 400-closing, 250-pressing, 350-return, 1000-ejection. Main ram presses at 5335 tons; side rams each operate at 1485 tons. This press is being used by Harvey Aluminum, in the aircraft heavy press program. *Lake Erie Engineering Corp.*

For more data circle No. 52 on postcard, p. 121.

Generator-type welders

Gasoline engine driven generator-type welders are available in current ranges of 30 to 350 amp, ac or dc. Welders are compact, completely self-powered and may be equipped with optional running gear. One dc model not only handles all types of dc welding but can be converted into an ac power plant by a conversion switch. An ac model also has a 110-v dc outlet for operating universal drills and lights. Another model can be used for Heliarc inert gas welding. *Westinghouse Electric Corp.*

For more data circle No. 53 on postcard, p. 121.

SAVE \$155 PER TON with *MicroRold*® 430 Stainless Steel

7½¢ Per Lb. Price Differential Between Types
430 and 302 Results In This Substantial Savings

By specifying MicroRold Type 430 stainless steel for suitable applications, stainless steel buyers can take advantage of the 7½¢ per pound difference in price between Type 430 and Type 302 stainless. A saving of \$155 per ton merits consideration. Type 430 is a straight chromium-stainless with a nominal composition of 17% Chromium. During the Korean conflict, Type 430 was used extensively, due to government restriction on nickel-bearing stainless.

WIDE USE FOR TYPE 430

While Type 430 does not possess the same degree of corrosion resistance as Type 302, it has proven very satisfactory in a wide range of mild corrosion applications, both interior and exterior. It lends itself to a multitude of decorative and functional uses combining all the advantages and qualities of stainless steel—beauty, strength, corrosion resistance, long life, workability and ease of maintenance. Considering the price advantage, with no sacrifice in quality when applied properly, stainless steel buyers will find MicroRold Type 430 a worthwhile material for an impressive number of stainless steel applications.



WASHINGTON

Corporation

PENNSYLVANIA

Silex Selects . . .

Hendrick Perforated Metal for its new Coffee-Casserole Warmer

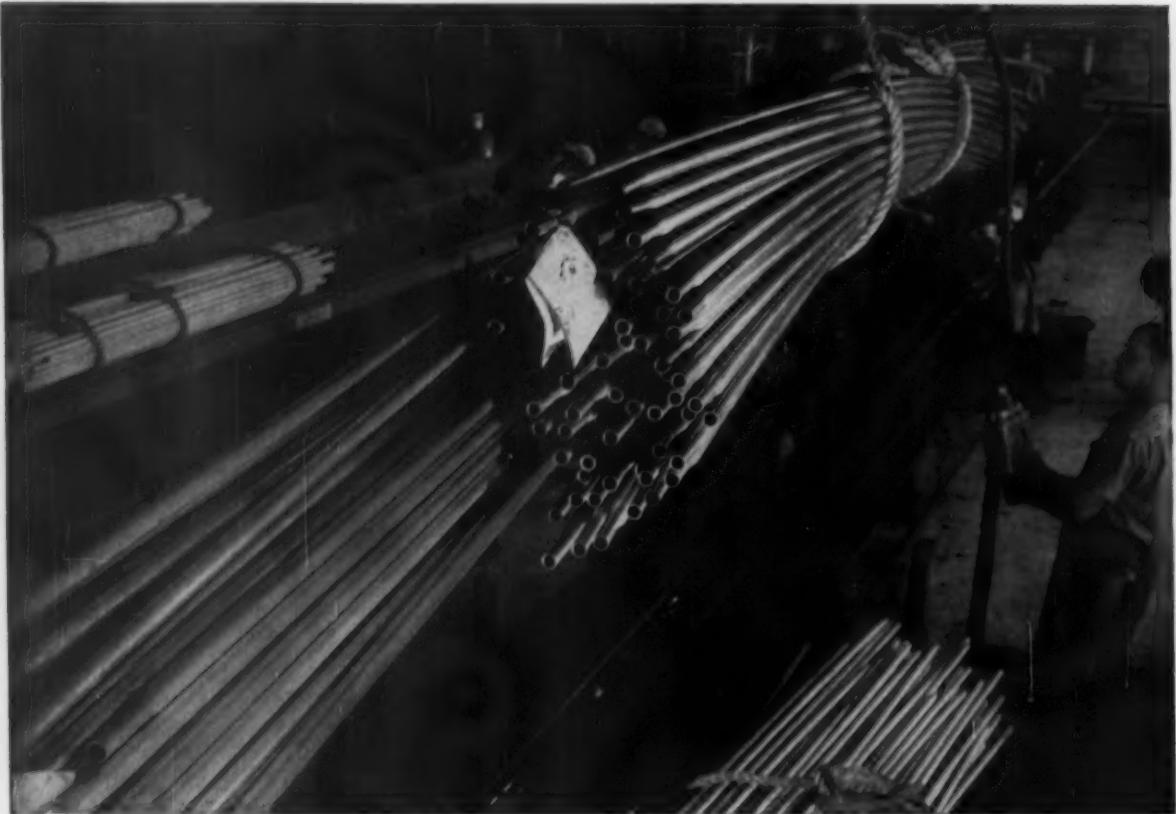


When the Silex Company decided to market a new two-unit candle warmer, they chose Hendrick Perforated Metal for the basic fabricating material. For Hendrick Perforated Metal not only helps increase a product's overall attractiveness, but it increases saleability as well. Select from hundreds of attractive designs in commercially rolled metals and gauges to suit your more exacting requirements.



Hendrick
MANUFACTURING COMPANY

37 DUNDAFF ST., CARBONDALE, PA. • Sales Offices in Principal Cities
Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armogrids



Good News about Titanium!

SUPERIOR TITANIUM TUBING NOW AVAILABLE IN A WIDE RANGE OF SIZES, FORMS, TEMPERS

The big news about titanium these days is not its high strength to weight ratio; its formability; its corrosion, heat and electrical resistance. Engineers know all this. What they want to know is *when*. The answer is *right now*, as far as tubing is concerned.

Although everything is special as far as the production of titanium tubing is concerned—more grinding operations are required, special lubricants have to be employed, drawing schedules have to be much lighter, annealing must be done in special furnaces, special pickling solutions are demanded—the end result is always a standard tubing obtainable from Superior distributors coast to coast. Sizes range in O.D. from .012" up to 1.50", in wall thickness from .002" to

.187", and in lengths up to 24 feet. Tempers—fully annealed, half hard and full hard. Forms—Seamless and Weldrawn®.

Applications are increasing rapidly. They now range from use in the atomic energy programs—to low stress aircraft structural parts—to pneumatic, hydraulic, refrigeration lines—to processing lines in the chemical industry.

Write now for your free copy of Bulletin 43—it contains complete technical and ordering information—and for the name of the Superior distributor nearest you. **SUPERIOR TUBE COMPANY**, 2004 Germantown Ave., Norristown, Pa. *On the West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif.*

Round and shaped tubing available in Carbon, Alloy and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium

Superior Tube

The big name in small tubing

All analyses .010" to 1/2" O.D. Certain analyses in light walls up to 2 1/2" O.D.



Titanium is reactive, must be heat treated without atmospheric contamination. This vacuum annealing furnace handles material 24 feet in length, operates at temperatures up to 1850°F, is automatically controlled.



All you need to know about titanium tubing is contained in this newly revised 8-page booklet—Bulletin 43. Contains processing information, properties, advantages and end uses, describes sizes, forms and tempers available.

The Iron Age SUMMARY . . .

Steel producers face biggest order logjam in years . . . Iron Age composite price up \$7.62 per ton . . . Demand still strong.

Up against it . . . It has become one of the biggest order logjams in steel history. The contract strike, short as it was, set deliveries back a week to 10 days on some products.

Two weeks after the walkout ended, mills are still struggling to get back to the pre-strike production level. It's questionable whether this will be achieved in the next several weeks.

Price Composite Jumps \$7.62 . . . The producers are confronted with (1) a maintenance problem compounded by effects of the shutdown, (2) a reduction in available supply of hot iron due to the strike and blast furnaces down for repairs, and (3) the usual hot weather and vacation problems which normally slow production during the summer.

Steel price increases following the wage settlement jumped THE IRON AGE finished steel base price composite \$7.62 per ton to \$103.56. THE IRON AGE composite does not include coated products, such as tinplate, which was not increased in price. For this reason, the composite rose more than the average of \$7.35 per ton announced by major producers.

No Letup in Demand . . . Meanwhile, there is no

prospect of a letdown in consumer demand. If anything, it is increasing in tempo. Automotive companies are pushing production to the hilt and expecting prompt deliveries in the face of short inventories. They will make the switch to new models almost without missing a beat in production. And a roll call of other industries shows pretty much the same picture.

It now looks as though consumers are in for another cut in their steel rations this quarter. And some mills will be forced to set aside at least one full month's production of some products—sheets for instance—to bring deliveries into line with promises. This day of reckoning will intensify the scramble for steel in fourth quarter.

Scrap on the loose . . . The scrap market is running wild. Prices this week jumped as much as \$5 per ton in some consuming areas. THE IRON AGE Scrap Composite rose \$1.33 per ton to \$38.50, an increase of more than \$3 in the last four weeks.

Steel companies are in a bad way for scrap. The blast furnace slowdowns and attempts to step up production to where it was before the strike has put a premium on scrap. Scrap prices were on the rise even before the strike.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week†	Last Week	Month Ago	Year Ago
Ingot Index (1947-49=100)	140.0	129.0*	144.8	95.5
Operating Rates				
Chicago	96.0	92.0*	98.0	70.0
Pittsburgh	94.0	93.0*	100.0	64.0
Philadelphia	94.0	85.0	95.3	56.0
Valley	96.0	88.0*	95.0	63.0
West	99.0	81.0*	98.4	77.5
Detroit	87.0	82.0	94.0	68.0
Buffalo	86.0	86.0	105.0	59.0
Cleveland	99.0	89.0*	103.0	68.0
Birmingham	94.0	84.0	94.0	75.0
S. Ohio River	87.0	71.0*	84.4	68.0
Wheeling	97.0	99.0*	101.0	78.0
St. Louis	92.0	82.0	102.0	52.0
Northeast	87.0	89.0	90.0	64.5
Aggregate	93.0	86.0*	96.5	—

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

This Week	Week Ago	Month Ago	Year Ago
--------------	-------------	--------------	-------------

Composite price			
Finished Steel, base	5.178	4.797	4.797
Pig iron (Gross ton)	\$59.09	\$56.59	\$56.59
Scrap, No. 1 hvy (gross ton)	\$38.50	\$37.17	\$34.00
			\$26.58

Nonferrous				
Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	36.00	36.00	36.00	30.00
Lead, St. Louis	14.80	14.80	14.80	13.80
Magnesium, ingot	29.25	29.25	29.25	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	95.25	95.00	93.50	96.50
Zinc, E. St. Louis	12.50	12.50	12.00	11.00

Carryovers Still Big Problem

**Carryovers on major mill products are extended
1-2 weeks . . . Deliveries are now running 7-8 weeks behind . . .
Producers eye 4th quarter orders cautiously.**

• THE SHORT-LIVED 12-hour strike is still figuring prominently in producers' delivery timetable schedules.

Word from Pittsburgh, the East and Chicago indicates that carryovers on major mill products have been extended one to two weeks. This means that delivery time on many products is now running up to seven to eight weeks, putting an even tighter squeeze on already log-jammed delivery schedules.

With third quarter delivery promises still in the backed-up stage for most producers, they're eyeing incoming fourth quarter business with non-committal caution at the moment.

In the East, one major producer is accepting fourth quarter orders for cold-rolled, hot-rolled and galvanized sheets on an "inquiry only" basis. In Detroit, because of substantial carryovers mills will have from third quarter, fourth quarter books haven't even opened. Chicago producers are considering the possibility of dropping 30 days on sheets at the beginning of fourth quarter while reducing customer allotments for the balance of the third quarter.

Higher prices for steel products, up about \$7.35 per ton, and pig iron—up \$2.50 a ton—will have no effect on pressure for deliveries. (For details on steel product prices, see page 61).

American Iron & Steel Institute reports a new monthly record for finished steel shipments in May—7,540,889 net tons as against the previous record of 7,436,919 tons set in March, 1953. New records were set for oil country goods, cold-rolled sheets and drawn wire.

The automotive industry continued to be steel's largest market classification.

STRUCTURALS AND SHAPES

• Pittsburgh mills are already committed for the remainder of the year on structurals. There's little hope now for customers who had hoped to squeeze out some tonnage for the fourth quarter. Chicago reports producers are sold out for third quarter, will probably reduce customer allotments in fourth quarter. A shutdown at one West Coast mill is stretching deliveries on structurals at a time when demand is mounting. And, in the East producers are allowing a two-month spread (Sept.-Oct.) in talking delivery dates on both structurals and shapes. Average delivery time is now running 7-10 weeks.

PLATES . . . Owing to some dropoff in production resulting from the strike plus upcoming vacation periods, Eastern producers are running 4-10 weeks behind in plate deliveries. Heavy demand from railroad carbuilding programs is expected to make the tight plate situation even tighter. Detroit mills won't even talk about plate anymore. Railroad orders have just about closed this market for the rest of the year. In Chicago, plate inventories at the warehouse level are low and are expected to get even lower. Unseasonably high order volume from customers continues unabated.

WIRE PRODUCTS . . . Pressure is off on merchant and manufacturers wire in Pittsburgh. Deliveries are expected to be current in about two weeks on construction wire. Manufacturing wire demand in Detroit is extremely good. Third quarter is now sold out with some fourth quarter orders now being accepted. From The Lincoln Electric Co., Cleveland, comes word that no change in current electrode prices will be put into effect at this time.

PIPE AND TUBING . . . In the East one producer reports deliveries on all sizes and grades of pipe are averaging 6-8 weeks. Chicago tubular products continue to be in tight supply with supplier stocks reported exhausted and shipper stocks almost as bad. Demand for oil country goods is being stepped up.

WAREHOUSE . . . West Coast warehouses report no unusual kicks from customers despite current price hikes. In Detroit there's no sign yet of a brisk pickup in warehouse business due to the added delays caused by steel shutdowns. Warehousemen look for an increase in business soon.

Purchasing Agent's Checklist:	
PRICES: How much will steel wage hike cost you?	p. 59
TIN: New loan slated to boost May-layan industries	p. 62
IRON ORE: Shortage of carriers hurts import picture	p. 64
SILICON: New markets for the non-metallic element open up	p. 68
MACHINE TOOLS: Aluminum cuts aircraft tooling costs	p. 85

Comparison of Prices

(Effective July 12, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	July 12 1955	July 5 1955	June 14 1955	July 13 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.05¢	4.05¢	4.05¢
Cold-rolled sheets	5.325	4.95	4.95	4.95
Galvanized sheets (10 ga.)	5.85	5.45	5.45	5.45
Hot-rolled strip	4.325	4.05	4.05	4.05
Cold-rolled strip	6.45	5.79	5.79	5.82
Plate	4.50	4.225	4.225	4.237
Plates wrought iron	9.30	9.30	9.30	9.30
Stain's C-R strip (No. 302)	44.50	41.50	41.50	41.50

Tim and Ternplates: (per base box)				
Timplate (1.50 lb.) cokes	\$8.05	\$8.05	\$8.05	\$8.95
Timplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. terns	7.85	7.85	7.85	7.75

Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.30¢	4.30¢	4.312¢
Cold-finished bars	5.90	5.40	5.40	5.40
Alloy bars	5.65	5.075	5.075	5.075
Structural shapes	4.60	4.25	4.25	4.25
Stainless bars (No. 302)	38.25	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40

Wire: (per pound)				
Bright wire	6.25¢	5.75¢	5.75¢	5.75¢

Rails: (per 100 lb.)				
Heavy rails	\$4.725	\$4.45	\$4.45	\$4.45
Light rails	5.65	5.35	5.35	5.35

Semifinished Steel: (per net ton)				
Rerolling billets	\$68.50	\$64.00	\$64.00	\$64.00
Slabs, rerolling	68.50	64.00	64.00	64.00
Forging billets	84.50	78.00	78.00	78.00
Alloy blooms, billets, slabs	96.00	86.00	86.00	86.00

Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	4.675¢	4.675¢	4.675¢
Skelp	4.225	3.90	3.90	3.90

Finished Steel Composite: (per pound)				
Base price	5.178¢	4.797¢	4.797¢	4.801¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	July 12 1955	July 5 1955	June 14 1955	July 13 1955
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Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$61.99	\$61.19	\$61.19	\$61.19
Foundry, Valley	59.99	56.50	56.50	56.50
Foundry, Southern, Cin'ti	63.99	60.43	60.43	60.43
Foundry, Birmingham	55.99	52.88	52.88	52.88
Foundry, Chicago	59.99	56.50	56.50	56.50
Basic, del'd Philadelphia	62.77	60.27	60.27	60.27
Basic, Valley furnace	58.50	56.00	56.00	56.00
Malleable, Chicago	59.99	56.50	56.50	56.50
Malleable, Valley	59.99	56.50	56.50	56.50
Ferromanganese, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
↑ 74-76 pct Mn base.				

Pig Iron Composite: (per gross ton)				
Pig iron	\$59.99	\$56.50	\$56.50	\$56.50

Bar: (per gross ton)				
No. 1 steel, Pittsburgh	\$39.50	\$37.50	\$34.50	\$35.50
No. 1 steel, Phila. area	39.50	35.50	35.00	22.75
No. 1 steel, Chicago	36.50	35.50	32.50	28.50
No. 1 bundles, Detroit	32.50	30.00	27.00	22.50
Low phos., Youngstown	40.50	38.50	35.50	30.50
No. 1 mach'y east, Pittsburgh	45.50	42.50	43.50	43.50
No. 1 mach'y east, Philadelphia	44.50	44.50	43.50	39.50
No. 1 mach'y east, Chicago	48.50	48.00	45.50	45.50

Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	\$35.50	\$37.17	\$34.00	\$36.50

Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$18.50	\$18.25	\$18.25	\$14.50
Foundry coke, prompt	18.25	16.25	16.25	16.75

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	55.00	54.00	54.00	54.00
Copper, Lake, Conn.	55.00	54.00	54.00	54.00
Tin, Straits, New York	95.25*	95.00*	95.00*	95.00
Zinc, East St. Louis	13.50	12.50	12.50	11.00
Lead, St. Louis	14.50	14.50	14.50	15.50
Aluminum, virgin ingot	25.20	25.20	25.20	25.20
Nickel, electrolytic	67.67	67.67	67.67	65.00
Magnesium, ingot	29.35	29.25	29.25	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

* Tentative. [†] Average. [‡] Revised.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on P. 168 →

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.	Product	301	302	303	304	316	321	346	410	416	430
Bethlehem B3	60.50	61.00	61.50	62.00		Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	37.75	15.00	—	15.25
Birdsboro, Pa. B6	60.50	61.00	61.50	62.00		Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	49.50	19.50	—	19.75
Birmingham R3	54.85	55.38				Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Birmingham W9	54.85	55.38				Billets, forging	—	32.00	34.75	33.75	51.25	38.25	58.00	25.50	26.00	26.00
Birmingham U4	54.85	55.38	59.00			Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	68.00	35.50	31.00	31.00
Buffalo R3	58.50	59.00	59.50			Plates	—	40.25	—	43.00	64.00	40.25	73.25	31.75	—	32.25
Buffalo H1	58.50	59.00	59.50			Sheets	44.25	44.50	—	47.25	68.25	54.25	82.00	36.25	—	36.75
Buffalo W6	58.50	59.00	59.50	60.00		Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	66.75	—	—	—
Chicago 14	58.50	59.00	59.50	59.50		Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	82.00	36.25	—	36.75
Cleveland A3	58.50	59.00	59.50	61.50												
Cleveland R3	58.50	59.00	59.50	61.50												
Daingerfield L3	55.00	55.00	55.00													
Duluth 14	58.50	59.00	59.50	59.50												
Erie 14	58.50	59.00	59.50	59.50												
Everett M6	63.50	64.00														
Fontana K1	64.50	65.00														
Granite, Utah C7	58.50	59.00														
Granite, City G2	60.40	60.50	61.40													
Hubbard Y1																
Minnequa C6	60.50	61.00	61.50													
Minnequa P6	58.50															
Nashville Is. P4	58.50	59.00	59.00													
N. Tonawanda T1	59.00															
Pittsburgh U1	58.50															
Toledo 14	58.50	59.00	59.00	59.50												
Troy, N. Y. R3	60.50	61.00	61.50	62.00	66.50											
Toledo 14	60.50	61.00	61.50	62.00	66.50											
Troy, N. Y. R3	60.50	61.00	61.50	62.00	66.50											
Youngstown Y1																

* DIFFERENTIALS: Add .50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct) except low phosph. 1.75 to 2.00 pct; .50¢ per ton for each 0.50 pct manganese over base; .50¢ per ton for each 1.00 pct nickel, \$1 for each additional, .025 pct nickel. Subtract .50¢ per ton for phosphorus content over 1.70 and over.

* Silvery iron: Buffalo, H1, 86.25; Jackson, J1, G1, 86.50. Add \$1.00 per ton for each 0.50 pct silicon over base (6.00 to 6.50 pct) up to 17. Add \$1 per ton for 0.75 pct nickel. Add 75¢ for each 0.50 pct manganese over 1.00 pct. Bessemer ferroresilicon prices are \$1 over comparable silvery iron.

* Unrevised.

STAINLESS STEEL PRODUCING POINTS:

Steel: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, J2;

Brokers Feel Price Pinch

Strength of dealer market creates broker buying problem . . . Detroit, Philadelphia, Cleveland, Pittsburgh, Chicago make broad gains . . . Composite up \$1.33.

♦ THE SCRAP market is generally strong and things are particularly tight at the broker buying level.

In most big centers, brokers are finding themselves squeezed between high dealer offerings and resistance by the mills to advances. In most cases, mill prices have moved upward again but dealer figures are tending to move faster.

One lagging area—Birmingham—reported the slack was being taken up to some extent by busier markets. In Buffalo, mills took steps to plug up an outward flow of scrap, and prices jumped upward for the most substantial gains in months.

Detroit, Chicago, Pittsburgh, Cleveland, Philadelphia, as well as Buffalo, reported broad gains.

Reflecting the general market strength, the Iron Age composite for No. 1 heavy melting rose \$1.33, moving to \$38.50.

Pittsburgh . . . The scrap market remains strong with pressure at the dealer level forcing prices of open-hearth grades up. What scrap comes into brokers' hands is limited in tonnage and at a premium price. For the most part they are waiting for the mills to step in and establish a firm market price. Blast furnace grades advanced \$2 a ton this week on the basis of a tonnage purchased by a large consumer. Heavy turnings were also pegged higher at \$36 to \$37 by the most recent mill purchases.

Chicago . . . Dealer market continues extremely strong and bidding on factory bundles very strong, with prices of as much as \$43 reported though mills not buying at this figure in the market. Railroad prices again advancing despite strong opposition from the mills. Some mill purchasing

at the bottom of the price spread last week in steelmaking grades but was offset by advanced railroad buying prices. Brokers report some difficulty in covering No. 1 heavy melting orders at \$36 broker buying. Cast slowing but prices holding very firm.

Philadelphia . . . Price of No. 1 heavy melting, reflecting the tight availability situation for the top steelmaking grade in the current scrambled market, is up \$1 over last week to \$40 a ton. Other steelmaking grades made similar gains. Railroad specialties are up \$1, while other grades are holding firm. No. 1 steel for export is even with or slightly below the domestic price level with outgoing shipments reported showing a steady level of activity.

New York . . . Price of No. 1 heavy melting moved up another dollar in the strong New York market. Heavy pressure at the dealer level is building up to more increases despite mill resistance.

Detroit . . . Two local mills made buys last week on a \$33 FOB basis. Meanwhile, the market has a firmer base than it did when the July automotive lists came out. Observers look for less scrap to be generated as the automakers cut production for new models but dealers think the market will hold steady because of comfortable scrap inventories at the mills.

Cleveland . . . Youngstown market advanced \$3 on top grade due to major Valley purchase of No. 1 railroad scrap there at \$42 and heavy broker speculation on bundles in Cleveland area. Top railroad generally brings \$1 premium over No. 1 heavy melting. Some brokers serving Valley mills are paying \$40 to fill older \$38 orders and pressure is building up with increased operations to make up brief strike loss. Cleveland price also rose with Valley.

Birmingham . . . Southern scrap markets have not yet reached to Pittsburgh strength and dealers are holding onto the little scrap coming into the yards until the market settles. Some No. 2 bundles are moving out of Alabama to the Pittsburgh area, a very unusual movement. Some brokers are paying \$1 a ton more for scrap to cover old orders, but trading is very limited. Mills are still out of the market and there was no activity in specialty grades. Electric furnace bundles were \$1 higher.

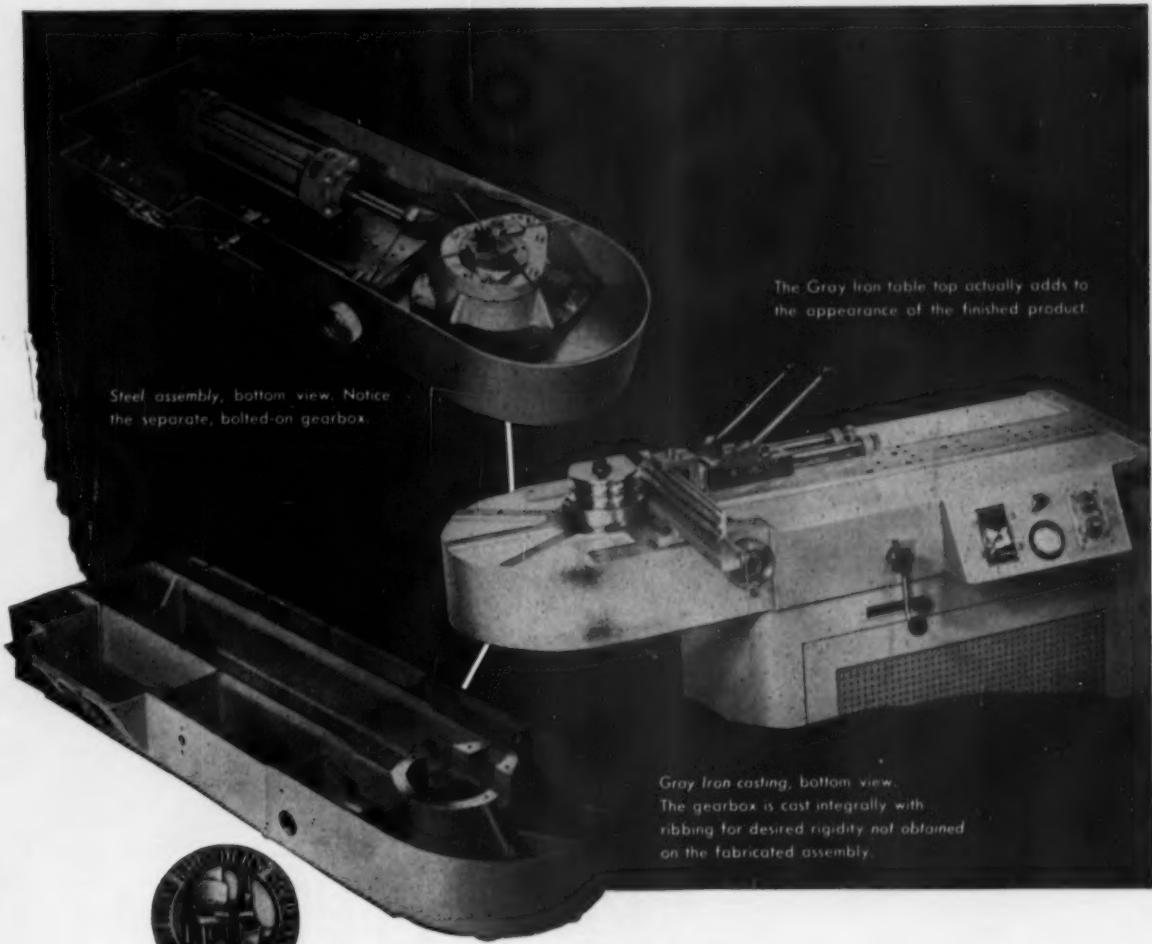
St. Louis . . . Steel mills in the St. Louis industrial district have not yet returned to their full stride following the shutdown due to the brief strike, and the operating rate is down to 92 pct. The flow of scrap which was halted for a few days by the strike has not yet resumed normal levels.

Cincinnati . . . A national broker outbid other firms last week for bundles from a major area stamping plant at \$37 and immediately began barge shipments from long-sluggish Cincinnati to Pittsburgh. Tonnage will deliver there with freight for about \$42. One local area mill which generally takes tonnage from stamping plant is filling its current needs from dealer yards and has substantial inventory on hand.

Buffalo . . . Pronounced strength swept local scrap market as the area's leading mill consumer recognized stronger tendencies in other centers and placed substantial orders for steelmaking grades at price advances of \$4.50-5.00 a ton. Buying by outside sources was reported also. Dealers who have steadfastly rejected lower bids now felt prices here were in line with other markets. Other grades followed steel items with gains varying from \$2-\$3 a ton. Huge mill inventories tended to temper dealers' enthusiasm.

Boston . . . Prices of steelmaking grades moved up this week and the market is looking a little stronger, but brokers are a little disappointed at the lagging volume of sales.

West Coast . . . San Francisco and Los Angeles mills say they're getting all the scrap they want at the new higher prices reported last week. Seattle is quiet; prices firm. Price of No. 1 cupola cast at San Francisco and Los Angeles was incorrectly listed at \$44 last week. Price should have been \$42.



Steel assembly, bottom view. Notice the separate, bolted-on gearbox.

The Gray Iron table top actually adds to the appearance of the finished product.

Gray Iron casting, bottom view.
The gearbox is cast integrally with
ribbing for desired rigidity not obtained
on the fabricated assembly.

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- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

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Producing these machine table tops in Gray Iron takes 7½ hours. Previously, the tops were fabricated of torch-cut steel segments, requiring 22½ hours.

Redesigning in Gray Iron has increased the rigidity of the table tops, improved their appearance and simplified production operations.

There are many valuable advantages which Gray Iron castings can offer you. Call your nearest Society member foundry and through him the full facilities of this association are available to help you.

Or, write direct to Gray Iron Founders' Society, Inc., National City-E, 6th Bldg., Cleveland 14, Ohio, for helpful technical and business information.

GRAY IRON FOUNDERS' SOCIETY

Scrap Prices (Effective July 18, 1955)

Pittsburgh

No. 1 hvy. melting	\$29.00 to \$40.00
No. 2 hvy. melting	26.00 to 37.00
No. 1 bundles	33.00 to 40.00
No. 2 bundles	30.00 to 31.00
Machine shop turn.	22.50 to 23.50
Mixed bor. and ms. turns.	22.50 to 23.50
Shoveling turnings	26.50 to 27.50
Cast iron borings	26.50 to 27.50
Low phos. punch'gs. plate	42.00 to 43.00
Heavy turnings	26.00 to 27.00
No. 1 RR. hvy. melting	36.50 to 37.50
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	42.00 to 44.00
RR. spring steel	42.00 to 44.00
RR. couplers and knuckles	42.00 to 44.00
No. 1 machinery cast.	43.00 to 44.00
Cupola cast	39.00 to 40.00
Heavy breakable cast	34.00 to 35.00

Chicago

No. 1 hvy. melting	\$36.00 to \$37.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 factory bundles	39.00 to 40.00
No. 1 dealers' bundles	35.00 to 37.00
No. 2 dealers' bundles	35.00 to 36.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	22.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. forge crops	42.00 to 43.00
Low phos. punch'gs. plate	40.00 to 45.00
Low phos. 3 ft and under	38.00 to 40.00
No. 1 RR. hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	47.00 to 48.00
Rerolling rails	55.00 to 56.00
Rails 2 ft and under	52.00 to 53.00
Locomotive tires, cut	39.00 to 40.00
Cut bolsters & side frames	42.00 to 42.00
Angles and splice bars	48.00 to 49.00
RR. steel car axles	47.00 to 48.00
RR. couplers and knuckles	45.00 to 46.00
No. 1 machinery cast	48.00 to 49.00
Cupola cast	44.00 to 45.00
Heavy breakable cast	25.00 to 36.00
Cast iron brake shoes	25.00 to 27.00
Cast iron car wheels	40.00 to 41.00
Malleable	46.00 to 48.00
Stove plate	35.00 to 37.00

Philadelphia Area

No. 1 hvy. melting	\$39.00 to \$40.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	29.00 to 31.00
Machine shop turn.	23.50 to 25.50
Mixed bor. short turn.	22.50 to 23.50
Cast iron borings	22.50 to 23.50
Shoveling turnings	25.00 to 28.00
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	40.00 to 41.00
Low phos. 3 ft and under	41.00 to 42.00
Low phos. punch'gs.	41.00 to 42.00
Elec. furnace bundles	40.00 to 41.00
Heavy turnings	34.00 to 35.00
RR. steel wheels	41.50 to 42.50
RR. spring steel	41.50 to 42.50
Rails 18 in. and under	60.00 to 61.00
Cupola cast	35.00 to 36.00
Heavy breakable cast	41.00 to 42.00
Cast iron car wheels	45.00 to 46.00
Malleable	44.00 to 45.00
Unstripped motor blocks	27.00 to 38.00
No. 1 machinery cast	44.00 to 45.00

Cleveland

No. 1 hvy. melting	\$38.00 to \$39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	35.00 to 36.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Cut struct'l & plates, 3 ft & under	42.00 to 44.00
Drop forge flashings	38.00 to 39.00
Low phos. punch'gs. plate	39.00 to 40.00
Foundry steel, 2 ft & under	43.00 to 44.00
No. 1 RR. heavy melting	40.00 to 41.00
Rails 2 ft and under	51.00 to 52.00
Rails 18 in. and under	52.00 to 53.00
Railroad grates bars	37.00 to 28.00
Steel axle turnings	28.00 to 29.00
Railroad cast	46.00 to 47.00
No. 1 machinery cast	46.00 to 47.00
Stove plate	41.00 to 42.00
Malleable	45.00 to 46.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$40.00 to \$41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	34.00 to 35.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 36.00
Low phos. plate	41.00 to 42.00

Buffalo

No. 1 hvy. melting	\$34.00 to \$35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 busheling	34.00 to 35.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	23.00 to 24.00
Low phos. plate	27.00 to 38.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	44.00 to 45.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast	42.00 to 43.00
No. 1 cupola cast	36.00 to 37.00

Detroit

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles, openhearth	32.00 to 33.00
No. 2 bundles	21.00 to 22.00
New busheling	32.00 to 33.00
Drop forge flashings	31.50 to 32.50
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.50 to 19.50
Shoveling turnings	18.50 to 19.50
Cast iron borings	18.50 to 19.50
Low phos. punch'gs. plate	32.00 to 33.00
No. 1 cupola cast	35.00 to 37.00
Heavy breakable cast	27.00 to 28.00
Stove plate	31.00 to 32.00
Automotive cast	40.00 to 41.00

St. Louis

No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	24.50 to 25.50
Machine shop turn.	17.50 to 18.50
Cast iron borings	19.50 to 20.50
Shoveling turnings	19.50 to 20.50
No. 1 RR. hvy. melting	36.00 to 37.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	49.00 to 50.00
Locomotive tires uncut	38.00 to 39.00
Angles and splice bars	38.00 to 39.00
Std. steel car axles	37.50 to 38.50
RR. specialties	38.00 to 39.00
Cupola cast	42.00 to 43.00
Hvy. breakable cast	34.00 to 35.00
Cast iron brake shoes	32.00 to 33.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Malleable	35.00 to 36.00
Unstripped motor blocks	33.50 to 34.50

Boston

No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	21.50 to 22.00
No. 1 busheling	30.00 to 31.00
Machine shop turn., 3 ft & under	33.00 to 34.00
Mixed bor. and short turn.	12.50 to 13.00
Shoveling turnings	16.25 to 16.75
Clean cast chem. borings	17.00 to 18.00
No. 1 machinery cast	30.00 to 31.00
Mixed cupola cast	28.00 to 29.00
Heavy breakable cast	29.00 to 30.00
Stove plate	28.00 to 29.00
Unstripped motor blocks	17.00 to 18.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$34.50
No. 2 hvy. melting	30.50
No. 1 bundles	\$22.50 to 24.50
Machine shop turn.	15.00 to 15.50
Mixed bor. and turn.	16.00 to 16.50
Shoveling turnings	17.00 to 17.50
Clean cast chem. borings	21.00 to 22.00
No. 1 machinery cast	25.00 to 37.00
Mixed yard cast	32.00 to 35.50
Charging box cast	25.00 to 35.50
Heavy breakable cast	25.00 to 35.50
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	32.00 to 33.00
Bar crops and plate, 3 ft	36.00 to 37.00
No. 1 RR. hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles & splice bars	42.00 to 44.00
Shoveling turnings	24.00 to 25.00
No. 1 cupola cast	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast	22.00 to 23.00
Cast iron car wheels	32.00 to 34.00
Unstripped motor blocks	34.50 to 35.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$35.00 to \$36.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles	35.00 to 36.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Low phos. 18 in. & under	40.00 to 41.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	48.00 to 49.00
No. 1 cupola cast	42.00 to 43.00
Hvy. breakable cast	36.00 to 37.00
Drop broken cast	46.00 to 47.00

San Francisco

No. 1 hvy. melting	\$32.00
No. 2 hvy. melting	30.00
No. 1 bundles	32.00
No. 2 bundles	27.00
No. 3 bundles	23.00
Machine shop turn.	12.00
Cast iron borings	11.00
No. 1 RR. hvy. melting	32.00
No. 1 cupola cast	42.00

Los Angeles

No. 1 hvy. melting	\$32.00
No. 2 hvy. melting	30.00
No. 1 bundles	32.00
No. 2 bundles	25.00
No. 3 bundles	22.00
Machine shop turn.	10.00
Shoveling turnings	12.00
Cast iron borings	12.00
Elect. furn. 1 ft. and under	32.00
No. 1 RR. hvy. melting	32.00
No. 1 cupola cast	42.00

Hamilton, Ont.

No. 1 hvy. melting	\$34.00
No. 2 hvy. melting	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Bushelings	29.00
Bush., new fact prep'd	32.00
Bush., new fact unprep'd	28.00
Machine shop turn.	16.00
Short steel turnings	21.00
Mixed bor. and turn.	\$16.00 to 17.00
Rails, rerolling	42.00
Cast scrap	42.00 to 45.00



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Copper Users on the Spot

Continuation of the copper strike early this week only aggravates an already serious problem . . . Anaconda offer seen as speeding settlement . . . Up brass-bronze ingot prices.

♦ THERE WAS little cheer for copper consumers early this week, as the crippling strike at Phelps Dodge Corp., Kennecott, American Smelting & Refining Co., as well as at American Brass Co., plants continued.

Only bright spots were: contract agreement reached between American Metal Co. and the International Union of Mine Mill & Smelter workers at the company's Carteret, N. J., refinery and a reported wage offer early this week by Anaconda along the lines of the recent steel settlement. The Anaconda offer was regarded as improving the chances of an end to the copper strike fairly soon.

Agreement with the American Metal Co. followed the steel pattern with workers getting a package increase of around 16½¢ per hour.

More nonferrous labor news is in the offing as Alcoa was expected to start its wage talks this week. Alcoa's contract does not run out until next year, but as in steel, the wage question is up for negotiation this year. If no agreement is reached by July 30, the workers have the right to strike.

It is expected that settlement of the aluminum wage question will be along the lines of the steel wage agreement.

COPPER . . . Other than labor news, the most important copper development was an increase in the price of brass and bronze ingots. Late last week one of the major producers of brass and bronze ingots upped its selling prices between 1.5¢ and 4¢ per lb. Other brass and bronze ingot makers followed suit immediately.

The copper scarcity, a serious problem before the strike, gets worse each day the labor dispute continues. Indicating just how bad the copper situation is, National Electrical Manufacturers Assn. last week sent a telegram to Commerce Secretary Sinclair Weeks urging: "restoration of allocation by Copper Division of copper being shipped to stockpile and relieving supplier of stockpile copper from contract."

NEMA also pointed out that "widespread unemployment will result among fabricators and customers as inventories are low and operating suppliers can only furnish small percentage of industry needs to cover sizable backlog of orders."

ALUMINUM . . . Problem of whether or not stricter controls should be placed on aluminum exports continues to be a hot topic in Washington. It was expected that the government this week would announce what the third quarter aluminum export quota will be. General feeling is that the quota limitation will not be reduced very much, if at all, from the current level of 9000 tons per quarter.

Aluminum production continues at its rapid rate, totaling 131,128 tons in May compared with 126,394 tons in April.

Production during the first 5 months of the year amounted to a record 632,234 tons compared with 594,641 tons in the first 5 months of 1954.

Shipments of aluminum products are also running way ahead of '54 totals. Following shows the breakdown on shipments for April and May:

	SHIPMENTS OF ALUMINUM MILL PRODUCTS	NET TONS
	May 1955	Apr. 1955
Sheet & Plate, total	52,105	57,095
Non-Heat-Treatable	48,543	46,146
Heat-Treatable	10,622	11,749
Foil (including foil in lamination, aluminum content only)	8,410	8,166
Extruded Products, total	17,527	15,801
Alloys 1100-3003-5052-6061-6062-6063	15,867	14,040
All Other Alloys	1,640	1,761
Tube, Drawn, total	2,744	3,808
Alloys 1100-3003-5052-6061-6062-6063	3,409	3,552
All Other Alloys	115	255
Bar and Rod, Rolled (½" and over, maximum diameter across flats)	7,590	8,095
Wire Other Than Conductor	1,835	1,770
ACSR and Cable, Bare	5,133	4,744
Forgings	2,027	2,027
Castings (incl. pistons, cookware), total	16,462	16,949
Sand	880	923
Permanent Mold	7,282	7,040
Die	8,300	8,185

MAGNESIUM . . . Primary production of magnesium ingot returned to normal during May, amounting to 4277 tons of ingot compared with the strike-cut April figure of 1859 tons. Magnesium Assn. figures also show that shipments of wrought product gained in May, amounting to 971 tons, up 10.6 pct from the previous month. Compared with May a year ago production is off 33.8 pct, but shipments were 72 pct above May '54 figure.

LEAD . . . Market continues to be fairly firm, although the strike at American Smelting & Refining Co. has taken one seller out of the market.

MERCURY . . . Price continues its downhill toboggan run. Latest quotation is \$275 to \$276 per 76-lb flask.

ZINC . . . As expected, zinc stocks underwent another considerable decline in June. At the end of the month stocks were estimated at 48,612 tons, down more than 14,000 tons from the May level of 63,184 tons. However, unfilled orders at the end of June also were off for the first time since February. As of June 30, American Zinc Institute estimated unfilled orders at 57,231 tons, compared with end-of-May total of 70,084 tons.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	July 6	July 7	July 8	July 9	July 11	July 12
Copper, electro, Conn.	36.00	36.00	36.00	36.00	36.00	36.00
Copper, Lake, delivered	36.00	36.00	36.00	36.00	36.00	36.00
Tin, Straits, New York	95.00	95.125	95.00	—	95.25	95.25*
Zinc, East St. Louis	12.50	12.50	12.50	12.50	12.50	12.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices

*Tentative



COPPER DETERMINATION

Alloymet 2030

(65% Nickel 30% Copper 5% Iron)*

A product of close Metallurgical **CONTROL**
for the production of low alloy steel and gray iron

Pre-alloyed master alloys are leaving an indelible mark on the iron and steel industry. The element of human error is reduced many fold, since a single alloying agent, ALLOYMET 2030 Ingot or shot, can replace many separate inoculants. A single trial of Alloymet 2030 or its companion alloys will make you an "Alloymet regular."

For further information, write us for our booklet, "Master Alloys."



*Nominal Chemical Composition

ALTER

Alloy Metal Division

C O M P A N Y 1701 Rockingham Road, DAVENPORT, IOWA

Phone 6-2561 Teletype DV 588

Nonferrous Prices

(Effective July 12, 1955)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet		Plate	
	0.032	0.061	0.136 in.	0.250 in.
1100, 3008	39.1	27.1	25.9	35.5
8004	44.0	39.8	38.1	27.6
5052	46.7	41.9	40.2	29.3
2024-O, -OAL	49.6	40.8	39.3	39.4
7075-O, -OAL	50.8	49.1	46.8	46.8

Extruded Solid Shapes: Shapes factors 1 to 6, 28.7¢ to 86.7¢; 12 to 14, 39.4¢ to \$1.04; 24 to 26, 42.2¢ to 91.3¢; 36 to 38, 49.4¢ to \$1.97. Rod, Round: Rolled, 1.064-4 in., 1100-F, 48.6¢ to 46.1¢; cold finished, 0.375-5.499 in., 1100-F, 47.4¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, 1/4-11/32 in., 63.6¢ to 80.1¢; 3/16 in., 49.9¢ to 46.9¢; 1 9/16-8 in., 46.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.074 in., 1100, 47.1¢ to 55.8¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.8¢ to 44.7¢; 6061-T4, 59.6¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T6, OD 1 1/4-2 in., 44.4¢ to 64.8¢; 2 1/4 in., 40.8¢ to 54.6¢; 4 1/4 in., 40.8¢ to 49.8¢; 6 1/2 in., 41.4¢ to 53.1¢.

Roofing sheet: Flat, per sheet, 0.032-in., 42¢; x 60-in., 32.09¢; x 96-in., 34.80¢; x 120-in., 36.00¢; x 144-in., 37.20¢. Coiled sheet, per lb, 0.019 in. x 28 in., 50.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: F81-O 1/4 in., 89¢; 8/16 in., 60¢; 5/8 in., 59¢; 0.064 in., 76¢; 0.032 in., 97¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: M, diam 1/4 to 0.311 in., 79¢; 1/2 to 5 in., 54.5¢; 1/4 to 1.749 in., 59¢; 2 1/2 to 5 in., 54.5¢. Other alloys higher. Base up to 1/4 in. diam, 10,000 lb; 5/8 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 2.5 in., 67.3¢; 0.22 to 0.25 lb, 5.9 in., 64.5¢; 0.50 to 0.59 lb, 8.6 in., 61.7¢; 1.8 to 2.59 lb, 19.5 in., 59.8¢; 4 to 6 lb, 28 in., 55¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/4 in., 10,000 lb; 5/8 to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD 1/4 to 5/16 in., \$1.46; 8/16 to 5/8 in., \$1.88; 5/8 to 1 in., 99¢; 1 to 2 in., 82¢; 0.168 to 0.219 in. wall: OD, 5/8 to 1 in., 67¢; 1 to 2 in., 69¢; 2 to 4 in., 62¢. Other alloys higher. Base OD: Up to 1/4 in., 10,000 lb; 1 1/4 to 8 in., 20,000 lb; over 8 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$14.00-\$14.50; alloy \$16.50; Plate, HR, commercially pure, \$11.50-\$12.00; alloy, \$12.50-\$13.75; Wire, rolled and/or drawn, commercially pure, \$10.50-\$11.00; alloy, \$12.50; Bar, HR or forged, commercially pure, \$8.50-\$8.75; alloy, \$6.50-\$9.00.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

"A" Nickel Monel Inconel

Sheet, CR	103	78	99
Strip, CR	103	87	125
Rod, Bar, HR	87	69	93
Angles, HR	87	69	93
Plate, HR	97	82	95
Seamless Tube, 122	108	108	153
Shot, Blocks	85	...	...

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Shapes
Copper	52.79	51.11	54.86
Copper, h-r	54.76	51.11	...
Copper, drawn	52.36	...	...
Low brass	49.75	49.69	...
Yellow brass	46.37	46.21	...
Red brass	50.99	50.93	...
Naval brass	44.30	45.56	...
Leaded brass	52.36	43.09	...
Com. bronze	52.78	52.72	...
Mang. bronze	53.73	47.83	49.39
Phos. bronze	73.03	73.53	...
Munts metal	48.14	43.95	45.20
Ni silver, 10 pct	60.30	63.28	66.34
Beryllium copper, CR, 1.9% Be, Base	2000 lb, f.o.b.	...	...
Strip	...	...	81.74
Rod, bar, wire	...	...	1.71

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%	10,000 lb, freight allowed	22.20
Aluminum pig	21.50	
Antimony, American, Laredo, Tex.	23.50	
Beryllium copper, per lb cont'd Be	\$40.00	
Beryllium aluminum 5% Be, Dollars per lb contained Be	\$72.75	
Bismuth, ton lots	82.25	
Cadmium, del'd	31.70	
Cobalt, 97-99% (per lb)	\$2.60 to \$2.67	
Copper, electro, Conn. Valley	36.00	
Copper, Lake, delivered	36.00	
Gold, U. S. Treas., per troy oz.	\$35.00	
Indium, 99.8%, dollars per troy oz.	\$2.25	
Iridium, dollars per troy oz.	\$90 to \$100	
Lead, St. Louis	14.80	
Lead, New York	15.00	
Magnesium, 99+%	f.o.b. Freeport, Tex., 10,000 lb, pig	28.50
Magnesium, sticks, 100 to 500 lb	29.25	
Mercury, dollars per 76-lb flask, f.o.b. New York	\$275 to \$276	
Nickel electro, f.o.b. N. Y. warehouse	67.87	
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	60.75	
Palladium, dollars per troy oz.	\$20 to \$21	
Platinum, dollars per troy oz.	\$77 to \$80	
Silver, New York, cents per troy oz.	90.125	
Tin, New York	95.26	
Titanium, sponge, grade A-1	\$3.95	
Zinc, East St. Louis	12.50	
Zinc, New York	13.00	
Zirconium, sponge	\$10.00	

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet		Plate	
	0.032	0.061	0.136 in.	0.250 in.
1100, 3008	39.1	27.1	25.9	35.5
8004	44.0	39.8	38.1	27.6
5052	46.7	41.9	40.2	29.3
2024-O, -OAL	49.6	40.8	39.3	39.4
7075-O, -OAL	50.8	49.1	46.8	46.8

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Screw Machine Stock: Rounds, 2011-T3, 1/4-11/32 in., 63.6¢ to 80.1¢; 3/16 in., 49.9¢ to 46.9¢; 1 9/16-8 in., 46.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.074 in., 1100, 47.1¢ to 55.8¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.8¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T6, OD 1 1/4-2 in., 44.4¢ to 64.8¢; 2 1/4 in., 40.8¢ to 54.6¢; 4 1/4 in., 40.8¢ to 49.8¢; 6 1/2 in., 41.4¢ to 53.1¢.

Roofing sheet: Flat, per sheet, 0.032-in., 42¢; x 60-in., 32.09¢; x 96-in., 34.80¢; x 120-in., 36.00¢; x 144-in., 37.20¢. Coiled sheet, per lb, 0.019 in. x 28 in., 50.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: F81-O 1/4 in., 89¢; 8/16 in., 60¢; 5/8 in., 59¢; 0.064 in., 76¢; 0.032 in., 97¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: M, diam 1/4 to 0.311 in., 79¢; 1/2 to 5 in., 54.5¢; 1/4 to 1.749 in., 59¢; 2 1/2 to 5 in., 54.5¢. Other alloys higher. Base up to 1/4 in. diam, 10,000 lb; 5/8 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 2.5 in., 67.3¢; 0.22 to 0.25 lb, 5.9 in., 64.5¢; 0.50 to 0.59 lb, 8.6 in., 61.7¢; 1.8 to 2.59 lb, 19.5 in., 59.8¢; 4 to 6 lb, 28 in., 55¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/4 in., 10,000 lb; 5/8 to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD 1/4 to 5/16 in., \$1.46; 8/16 to 5/8 in., \$1.88; 5/8 to 1 in., 99¢; 1 to 2 in., 82¢; 0.168 to 0.219 in. wall: OD, 5/8 to 1 in., 67¢; 1 to 2 in., 69¢; 2 to 4 in., 62¢. Other alloys higher. Base OD: Up to 1/4 in., 10,000 lb; 1 1/4 to 8 in., 20,000 lb; over 8 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$14.00-\$14.50; alloy \$16.50; Plate, HR, commercially pure, \$11.50-\$12.00; alloy, \$12.50-\$13.75; Wire, rolled and/or drawn, commercially pure, \$10.50-\$11.00; alloy, \$12.50; Bar, HR or forged, commercially pure, \$8.50-\$8.75; alloy, \$6.50-\$9.00.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

"A" Nickel Monel Inconel

Sheet, CR	103	78	99
Strip, CR	103	87	125
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Plate, HR	97	82	95
Seamless Tube, 122	108	108	153
Shot, Blocks	85

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Shapes
Copper	52.79	51.11	54.86
Copper, h-r	54.76	51.11	...
Copper, drawn	52.36	...	...
Low brass	49.75	49.69	...
Yellow brass	46.37	46.21	...
Red brass	50.99	50.93	...
Naval brass	44.30	45.56	...
Leaded brass	52.36	43.09	...
Com. bronze	52.78	52.72	...
Mang. bronze	53.73	47.83	49.39
Phos. bronze	73.03	73.53	...
Munts metal	48.14	43.95	45.20
Ni silver, 10 pct	60.30	63.28	66.34
Beryllium copper, CR, 1.9% Be, Base	2000 lb, f.o.b.	...	...
Strip	...	...	81.74
Rod, bar, wire	...	...	1.71

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%	10,000 lb, freight allowed	22.20
Aluminum pig	21.50	
Antimony, American, Laredo, Tex.	23.50	
Beryllium copper, per lb cont'd Be	\$40.00	
Beryllium aluminum 5% Be, Dollars per lb contained Be	\$72.75	
Bismuth, ton lots	82.25	
Cadmium	31.70	
Silver 99 fine, rolled, 100 oz. lots, per troy oz., f.o.b. Bridgeport, Conn.	94%	

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet		Plate	
	0.032	0.061	0.136 in.	0.250 in.
1100, 3008	39.1	27.1	25.9	35.5
8004	44.0	39.8	38.1	27.6
5052	46.7	41.9	40.2	29.3
2024-O, -OAL	49.6	40.8	39.3	39.4
7075-O, -OAL	50.8	49.1	46.8	46.8

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Screw Machine Stock: Rounds, 2011-T3, 1/4-11/32 in., 63.6¢ to 80.1¢; 3/16 in., 49.9¢ to 46.9¢; 1 9/16-8 in., 46.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.074 in., 1100, 47.1¢ to 55.8¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.8¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T6, OD 1 1/4-2 in., 44.4¢ to 64.8¢; 2 1/4 in., 40.8¢ to 54.6¢; 4 1/4 in., 40.8¢ to 49.8¢; 6 1/2 in., 41.4¢ to 53.1¢.

Roofing sheet: Flat, per sheet, 0.032-in., 42¢; x 60-in., 32.09¢; x 96-in., 34.80¢; x 120-in., 36.00¢; x 144-in., 37.20¢. Coiled sheet, per lb, 0.019 in. x 28 in., 50.9¢.

IRON AGE STEEL PRICES (Effective July 12, 1955)			Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.												
EAST	BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP							
	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hm- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled	
Bethlehem, Pa.			<i>\$96.00 B3</i>			<i>4.65 B3</i>	<i>4.80 B3</i>	<i>4.65 B3</i>							
Buffalo, N. Y.	<i>\$88.50 B3</i>	<i>\$84.50 R3, B3</i>	<i>\$96.00 R3, B3</i>	<i>5.45 B3</i>		<i>4.65 B3</i>	<i>4.80 B3</i>	<i>4.65 B3</i>	<i>4.325 R3,B3</i>	<i>6.45 R7,S10</i>	<i>6.425 B3</i>	<i>B3</i>			
Claymont, Del.															
Harrison, N. J.															
Conshohocken, Pa.															
New Bedford, Mass.															
Johnstown, Pa.	<i>\$88.50 B3</i>	<i>\$84.50 B3</i>	<i>\$96.00 B3</i>			<i>4.65 B3</i>	<i>4.80 B3</i>		<i>4.325 B3</i>						
Boston, Mass.															
New Haven, Conn.															
Phoenixville, Pa.						<i>4.65 P2</i>		<i>4.65 P2</i>							
Sparrows Pt., Md.									<i>4.325 B3</i>	<i>T8,B3</i>	<i>6.425 B3</i>	<i>R3</i>			
Bridgeport, Wallingford, Conn.		<i>N8</i>	<i>N8</i>						<i>4.625 N8</i>	<i>W1</i>			<i>7.50 N8</i>		
Pawtucket, R. I.														<i>A5 N7</i>	
Worcester, Mass.															
Alton, Ill.										<i>4.50 L1</i>					
Ashland, Ky.										<i>4.325 A7</i>					
Canton-Massillon, Dover, Ohio		<i>\$88.50 R3</i>	<i>\$96.00 R3</i>											<i>13.45 G4</i>	
Chicago, Ill.	<i>\$88.50 U1</i>	<i>\$84.50 R3, U1,W8</i>	<i>\$96.00 R3, U1,W8</i>	<i>5.45 U1</i>	<i>4.60 U1, W8</i>	<i>6.75 U1, Y1</i>	<i>4.60 U1</i>		<i>4.325 A1, N4,W8</i>	<i>6.55 A1,T8</i>			<i>7.20 W8</i>	<i>13.45 T8</i>	
Cleveland, Ohio										<i>6.45 A5,J3</i>		<i>9.30 A5</i>		<i>13.45 A5</i>	
Detroit, Mich.			<i>\$96.00 R5</i>						<i>4.425 G3,M2</i>	<i>6.55* D1,D2, G3,M2,P11</i>	<i>6.525 G3</i>	<i>9.40 D2, G3</i>			
Duluth, Minn.															
Gary, Ind. Harbor, Indiana	<i>\$88.50 U1</i>	<i>\$84.50 U1</i>	<i>\$96.00 U1, Y1</i>	<i>5.45 J3</i>	<i>4.60 U1, J3</i>	<i>6.75 U1, J3</i>			<i>4.325 J3, U1,Y1</i>	<i>6.55 J3</i>	<i>6.425 J3, U1,Y1</i>	<i>9.30 Y1</i>	<i>7.20 Y1, U1</i>		
Sterling, Ill.										<i>N4</i>					
Indianapolis, Ind.											<i>C5</i>				
Newport, Ky.														<i>7.20 N5</i>	
Middletown, Ohio											<i>6.45 A7</i>				
Niles, Warren, Ohio Sharon, Pa.	<i>\$88.50 C10</i>	<i>\$84.50 C10</i>	<i>\$96.00 C10</i>							<i>4.325 S1, R3</i>	<i>6.45 S1, R3,T4</i>	<i>6.425 S1, R3</i>	<i>9.30 S1, R3</i>	<i>7.20 S1</i>	<i>13.45 S1</i>
Pittsburgh, Pa. Midland, Pa. Butler, Pa.	<i>\$88.50 U1, J3</i>	<i>\$84.50 J3, U1,C11</i>	<i>\$96.00 U1, C11</i>	<i>5.45 U1</i>	<i>4.60 U1, J3</i>	<i>6.75 U1, J3</i>	<i>4.60 U1</i>		<i>4.325 P6</i>	<i>6.45 B4, J3,S7</i>			<i>7.20 S9</i>	<i>S9</i>	
Portsmouth, Ohio										<i>4.325 P7</i>	<i>6.45 P7</i>				
Weirton, Wheeling, Follansbee, W. Va.							<i>4.60 W3</i>			<i>4.325 W3</i>	<i>6.45 F3,W3</i>	<i>6.425 W3</i>	<i>9.30 W3</i>		
Youngstown, Ohio		<i>\$84.50 C10</i>	<i>\$96.00 Y1, C10</i>				<i>4.60 Y1</i>	<i>6.75 Y1</i>		<i>4.325 U1, Y1</i>	<i>6.45 Y1,C5</i>	<i>6.425 U1, Y1</i>	<i>9.30 Y1</i>	<i>7.20 U1, Y1</i>	<i>13.45 C5</i>
Fontana, Cal.	<i>\$76.00 K1</i>	<i>\$92.00 K1</i>	<i>\$115.00 K1</i>			<i>5.25 K1</i>	<i>7.40 K1</i>	<i>5.40 K1</i>	<i>50.75 K1</i>	<i>8.20 K1</i>	<i>7.925 K1</i>			<i>8.85 K1</i>	
Geneva, Utah		<i>\$84.50 C7</i>				<i>4.60 C7</i>	<i>6.75 C7</i>								
Kansas City, Mo.						<i>4.70 S2</i>	<i>6.85 S2</i>								
Los Angeles, Torrance, Cal.				<i>B2</i>	<i>B2</i>	<i>5.30 C7, B2</i>		<i>H2</i>		<i>5.975 C7, B2</i>	<i>8.50 C1</i>			<i>7.42 S2</i>	
Minnequa, Colo.						<i>C6</i>				<i>C6</i>					
Portland, Ore.						<i>O2</i>									
San Francisco, Niles, Pittsburg, Cal.				<i>B2</i>		<i>B2</i>	<i>P9</i>	<i>H2</i>		<i>5.975 B2, C7</i>					
Seattle, Wash.				<i>B2</i>		<i>B2</i>		<i>B2</i>		<i>B2</i>					
Atlanta, Ga.										<i>4.325 A8</i>					
Fairfield, Ala., City, Birmingham, Ala.	<i>\$88.50 T2</i>	<i>\$84.50 T2</i>				<i>4.60 C16, R3,T2</i>	<i>6.75 T2</i>			<i>4.325 R3, C16,T2</i>		<i>6.425 T2</i>			
Houston, Lone Star, Tex.	<i>L3</i>	<i>\$88.50 S2</i>	<i>\$101.00 S2</i>			<i>4.70 S2</i>	<i>6.85 S2</i>					<i>6.875 S2</i>		<i>7.40 S2</i>	

STEEL PRICES

(Effective July 15, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

EAST

MIDDLE WEST

WEST

SOUTH

166

THE IRON AGE

	SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE	
	Hot-rolled 18 ga. & heavier	Cold- rolled	Galvanized 10 ga.	Enamel- ing 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box		
Bethlehem, Pa.													
Buffalo, N. Y.	4.325 B3	5.325 B3				6.375 B3	7.875 B3						
Claymont, Del.													
Coatesville, Pa.													
Conshohocken, Pa.	4.375 A2	5.375 A2				6.425 A2							
Harrisburg, Pa.													
Hartford, Conn.													
Johnstown, Pa.													
Fairless, Pa.	4.375 U1	5.375 U1				6.425 U1	7.925 U1						
New Haven, Conn.													
Phoenixville, Pa.													
Sparrows Pt., Md.	4.325 B3	5.325 B3	5.85 B3			6.375 B3	7.875 B3	8.60 B3	B3	\$8.90 B3	\$7.40 B3		
Worcester, Mass.													
Trenton, N. J.													
Alton, Ill.										5.20 L1			
Ashland, Ky.	4.325 A7		5.85 A7	5.90 A7									
Canton-Massillon, Dover, Ohio			5.85 R1, R3										
Chicago, Joliet, Ill.	4.325 A1, W8					6.375 U1				5.825 A5, N4, R3			
Sterling, Ill.										5.125 N4			
Cleveland, Ohio	4.325 J3, R3	5.325 J3, R3		5.90 R3		6.375 J3, R3	7.875 J3, R3			5.825 A5			
Detroit, Mich.	4.425 G3, M2	5.425 G3				6.475 G3	7.975 G3						
Newport, Ky.	4.325 N5	5.325 N5	5.85 N5										
Gary, Ind. Harbor, Indiana	4.325 J3, U1, Y1	5.325 J3, U1, Y1	5.85 U1, J3	5.90 U1, J3	6.25 U1	6.375 Y1, U1, J3	7.875 U1, Y1			Y1	\$8.90 J3, U1, Y1	\$7.50 J3, U1, Y1	6.65 U1, Y1
Granite City, Ill.	4.525 G2	5.325 G2	6.05 G2	6.10 G2									
Kokomo, Ind.	4.425 C9		5.95 C9						C9	C9			
Massfield, Ohio					6.25 E2				E2				
Middletown, Ohio		5.325 A7	5.85 A7	5.90 A7	6.25 A7								
Niles, Warren, Ohio Sharon, Pa.	4.325 S1, R3, N3	5.325 R3, N3	5.85 N3, R3	5.90 N3	6.25 N3	6.375 S1, R3	7.875 R3				\$8.80 R3	\$7.50 R3	
Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 J3, U1, P6	5.325 J3, U1, P6	5.85 U1	5.90 U1		6.375 J3, U1	7.875 U1	8.60 U1	5.825 A5 P6	\$8.80 J3, U1	\$7.50 J3, U1	6.65 U1	
Portsmouth, Ohio	4.325 P7	5.325 P7							P7				
Watertown, Wheeling, Follansbee, W. Va.	4.325 W3, W5	5.325 W3, W5, F3	5.85 W3, W5		6.25 W3, W5	6.375 W3	7.875 W3				\$8.80 W3, W5	\$7.50 W3, W5	6.65 F3, H5
Youngstown, Ohio	4.325 U1, Y1	5.325 Y1			5.90 Y1		6.375 U1, Y1	7.875 Y1					
Fountain, Cal.	5.975 K1	6.425 K1				7.125 K1	8.975 K1			K1			
Genoa, Utah	4.425 C7												
Kansas City, Mo.										5.275 S2			
Los Angeles, Torrance, Cal.										B2			
Minneapolis, Colo.										C6			
San Francisco, Niles, Pittsburgh, Cal.	5.825 C7	6.215 C7	6.60 C7							5.875 C7	\$9.55 C7	\$8.25 C7	
Seattle, Wash													
Atlanta, Ga.													
Fairfield, Ala. Alabama City, Ala.	4.325 R3, T2	5.325 T2	5.85 R3, T2			6.375 T2			R3	5.825 R3, T2	\$8.90 T2	\$7.60 T2	
Houston, Tex.										S2			

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.										
STEEL PRICES (Effective July 12, 1955)		BARS					PLATES				WIRE	
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 <i>B3</i>	7.425 <i>B3</i>	6.80 <i>B3</i>					
	Buffalo, N. Y.	4.65 <i>B3,R3</i>	4.65 <i>B3,R3</i>	5.95 <i>B3</i>	5.575 <i>B3,R3</i>	7.425 <i>B3,B5</i>	6.80 <i>B3</i>	4.50 <i>B3,F3</i>			6.725 <i>B3</i>	6.25 <i>W6</i>
	Claymont, Del.							4.50 <i>C4</i>		6.30 <i>C4</i>		
	Coatesville, Pa.							4.50 <i>L4</i>		6.30 <i>L4</i>	6.725 <i>L4</i>	
	Conshohocken, Pa.							4.50 <i>A2</i>	5.575 <i>A2</i>		6.725 <i>A2</i>	
	Harrisburg, Pa.							4.50 <i>C3</i>	5.575 <i>C3</i>			
	Hartford, Conn.			6.40 <i>R3</i>		7.725 <i>R3</i>						
	Johnstown, Pa.	4.65 <i>B3</i>	4.65 <i>B3</i>		5.575 <i>B3</i>		6.80 <i>B3</i>	4.50 <i>B3</i>		6.30 <i>B3</i>	6.725 <i>B3</i>	6.25 <i>B3</i>
	Fairless, Pa.	4.80 <i>U1</i>	4.80 <i>U1</i>		5.725 <i>U1</i>							
	Newark, N. J.				6.35 <i>W10</i>		7.80 <i>W10</i>					
	Camden, N. J.				6.35 <i>P19</i>							
MIDDLE WEST	Bridgeport, Putnam, Conn.	4.90 <i>N8</i>		6.45 <i>W10</i>	5.725 <i>N8</i>			<i>N8</i>				
	Sparrows Pt., Md.		4.65 <i>B3</i>					4.50 <i>B3</i>		6.30 <i>B3</i>	6.725 <i>B3</i>	<i>R3</i>
	Palmer, Worcester, Readville, Mansfield, Mass.				6.35 <i>W11</i> 6.45 <i>B3,C14</i>		7.725 <i>A5,B5</i>					6.35 <i>A5,W6</i>
	Alton, Ill.	4.85 <i>L1</i>										<i>L1</i>
	Ashland, Newport, Ky.							4.50 <i>A7,N5</i>		6.30 <i>N5</i>		
	Canton-Massillon, Mansfield, Ohio	4.75 <i>R3</i>		5.90 <i>R2,R3</i>	5.575 <i>R3,T5</i>	7.425 <i>R2,R3,T5</i>		4.50 <i>E2</i>				
	Chicago, Joliet, Ill.	4.85 <i>U1,N4,W8,R3,P13</i>	4.65 <i>N4,R3,P13</i>	5.90 <i>A5,W10,W8,B5,L2</i>	5.575 <i>U1,R3,W8</i>	7.425 <i>A5,W8,W10,L2,B5</i>		4.50 <i>U1,W8,I3,A1,R3</i>	5.575 <i>U1</i>	6.30 <i>U1</i>	6.725 <i>U1</i>	6.25 <i>A5,R3,N4,W7</i>
	Cleveland, Ohio	4.85 <i>R3</i>	4.65 <i>R3</i>	5.90 <i>A5,C13</i>		7.425 <i>A5,C13</i>	6.80 <i>R3</i>	4.50 <i>J3,R3</i>	5.575 <i>J3</i>		6.725 <i>J3,R3</i>	6.25 <i>A5,C13</i>
	Detroit, Mich.	4.75 <i>G3</i> 4.80 <i>R5</i>	4.75 <i>G3</i>	5.90 <i>R5</i> 6.18 <i>B5</i>	5.575 <i>R5</i> 5.875 <i>G3</i>	7.425 <i>R5</i> 7.625 <i>B5,P3,P8</i>	6.80 <i>G3</i>	4.60 <i>G3</i>				6.825 <i>G3</i>
	Duluth, Minn.											6.25 <i>A5</i>
	Gary, Ind. Harbor, Crawfordsville	4.65 <i>I3,U1,Y1</i>	4.65 <i>I3,U1,Y1</i>	5.90 <i>M5,R3</i>	5.575 <i>I3,U1,Y1</i>	7.425 <i>M5,R3</i>	6.80 <i>I1,I3,Y1</i>	4.50 <i>I3,U1,Y1</i>	5.575 <i>I3</i>	6.30 <i>U1,Y1</i>	6.725 <i>U1,I3,Y1</i>	6.35 <i>M4</i>
WEST	Granite City, Ill.								62			<i>C9</i>
	Kokomo, Ind.											<i>N4</i>
	Sterling, Ill.	4.75 <i>N4</i>	4.75 <i>N4</i>									
	Niles, Ohio	4.65 <i>R3</i>					6.80 <i>R3</i>	4.50 <i>S1,R3</i>		6.30 <i>S1</i>	6.725 <i>S1</i>	
	Sharon, Pa.											
	Pittsburgh, Pa. Midland, Pa.	4.65 <i>J3,U1,C11</i>	4.65 <i>J3,U1,C11</i>	5.90 <i>A5,C8,C11,J3,W10,B4,R3</i>	5.575 <i>U1,C11</i>	7.425 <i>A5,C11,W10,C8,R3</i>	6.80 <i>J3,U1</i>	4.50 <i>J3,U1</i>	5.575 <i>U1</i>	6.30 <i>U1</i>	6.725 <i>J3,U1,P6</i>	6.25 <i>A5,J3,P6</i>
	Portsmouth, Ohio											6.25 <i>P7</i>
	Weirton, Wheeling, Follansbee, W. Va.	4.65 <i>W3</i>						4.50 <i>W3,W5</i>				
	Youngstown, Ohio	4.65 <i>U1,Y1,C10,R3</i>	4.65 <i>U1,Y1,R3</i>	5.90 <i>Y1,U1,R3</i>	5.575 <i>U1,Y1,C10</i>	7.425 <i>Y1,C10,7.665 F2</i>	6.80 <i>U1,Y1</i>	4.50 <i>U1,Y1,R3</i>		6.30 <i>Y1</i>	6.725 <i>Y1</i>	6.25 <i>Y1</i>
	Emeryville, Cal.	5.40 <i>J5</i>	5.40 <i>J5</i>									
	Fontana, Cal.	5.35 <i>K1</i>	5.35 <i>K1</i>		6.625 <i>K1</i>		7.50 <i>K1</i>	5.15 <i>K1</i>		6.95 <i>K1</i>	7.375 <i>K1</i>	
SOUTH	Genoa, Utah							4.50 <i>C7</i>			6.725 <i>C7</i>	
	Kansas City, Mo.	4.90 <i>S2</i>	4.90 <i>S2</i>		<i>S2</i>		<i>S2</i>					<i>S2</i>
	Los Angeles, Torrance, Cal.	5.35 <i>B2,C7</i>	5.35 <i>B2,C7</i>	<i>R3</i>	<i>B2</i>		<i>B2</i>					7.20 <i>B2</i>
	Minnequa, Colo.	5.10 <i>C6</i>	5.10 <i>C6</i>					<i>C6</i>				<i>C6</i>
	Portland, Ore.	5.40 <i>O2</i>	5.40 <i>O2</i>									
	San Francisco, Niles, Pittsburgh, Cal.	5.35 <i>C7</i> 5.40 <i>B2,P9</i>	5.35 <i>C7</i> 5.40 <i>B2,P9</i>				<i>B2</i>					7.20 <i>C7</i>
	Seattle, Wash.	5.40 <i>B2,P12,N6</i>	5.40 <i>B2,P12,N6</i>				<i>B2</i>	<i>B2</i>		<i>B2</i>	<i>B2</i>	
	Atlanta, Ga.	4.85 <i>A8</i>	4.85 <i>A8</i>									<i>A8</i>
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	4.65 <i>T2,C16,R3</i>	4.65 <i>T2,C16,R3</i>				6.80 <i>T2</i>	4.50 <i>T2,R3</i>		6.725 <i>T2</i>	6.25 <i>R3,T2</i>	
	Houston, Ft. Worth, Lone Star, Tex.	4.90 <i>S2</i>	4.90 <i>S2</i>		<i>S2</i>		<i>S2</i>	<i>L3</i> <i>S2</i>		<i>S2</i>	<i>S2</i>	<i>S2</i>

Steel Prices (Effective July 18, 1955)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
 A2 Alan Wood Steel Co., Conshohocken, Pa.
 A3 Allegheny Ludlum Steel Corp., Pittsburgh
 A4 American Cleatments Co., Carnegie, Pa.
 A5 American Steel & Wire Div., Cleveland
 A6 Angell Nail & Chapin Co., Cleveland
 A7 Armcro Steel Corp., Middletown, O.
 A8 Atlantic Steel Co., Atlanta, Ga.
 B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
 B2 Bethlehem Pacific Coast Steel Corp., San Francisco
 B3 Bethlehem Steel Co., Bethlehem, Pa.
 B4 Blair Strip Steel Co., New Castle, Pa.
 B5 Bliss & Laughlin, Inc., Harvey, Ill.
 B6 Brocks Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
 C1 Caltrite Steel Corp., Los Angeles
 C2 Carpenter Steel Co., Reading, Pa.
 C3 Central Iron & Steel Co., Harrisburg, Pa.
 C4 Claymont Products Dept., Claymont, Del.
 C5 Cold Metal Products Co., Youngstown, O.
 C6 Colorado Fuel & Iron Corp., Denver
 C7 Columbia Geneva Steel Div., San Francisco
 C8 Columbia Steel & Shafing Co., Pittsburgh
 C9 Continental Steel Corp., Kokomo, Ind.
 C10 Copperweld Steel Co., Pittsburgh, Pa.
 C11 Crucible Steel Co. of America, Pittsburgh
 C12 Cumberland Steel Co., Cumberland, Md.
 C13 Cuyahoga Steel & Wire Co., Cleveland
 C14 Compressed Steel Shafing Co., Rosedale, Mass.
 C15 G. O. Carlson, Inc., Thorndale, Pa.
 C16 Connors Steel Div., Birmingham
 D1 Detroit Steel Corp., Detroit
 D2 Detroit Tube & Steel Div., Detroit
 D3 Driver Harris Co., Harrison, N. J.
 D4 Dickson Weatherproof Nail Co., Evanston, Ill.
 D5 Henry Distant & Sons, Inc., Philadelphia
 E1 Eastern Stainless Steel Corp., Baltimore
 E2 Empire Steel Co., Mansfield, O.
 F1 Firth Sterling, Inc., McKeesport, Pa.
 F2 Fitzsimmons Steel Corp., Youngstown
 F3 Follansbee Steel Corp., Follansbee, W. Va.
 G1 Globe Iron Co., Jackson, O.

G2 Granite City Steel Co., Granite City, Ill.
 G3 Great Lakes Steel Corp., Detroit
 G4 Greer Steel Co., Dover, O.
 H1 Hanna Furnace Corp., Detroit
 J1 Ingersoll Steel Div., Chicago
 J2 Inland Steel Co., Chicago
 J4 Interlake Iron Corp., Cleveland
 J1 Jackson Iron & Steel Co., Jackson, O.
 J2 Jesse Steel Corp., Washington, Pa.
 J3 Jones & Laughlin Steel Corp., Pittsburgh
 J4 Joslyn Mfg. & Supply Co., Chicago
 J5 Judson Steel Corp., Emeryville, Calif.
 K1 Kaiser Steel Corp., Fontana, Cal.
 K2 Keystone Steel & Wire Co., Peoria
 K3 Koppers Co., Granite City, Ill.
 L1 Laclede Steel Co., St. Louis
 L2 La Salle Steel Co., Chicago
 L3 Lone Star Steel Co., Dallas
 L4 Lukens Steel Co., Coatesville, Pa.
 M1 Mahoning Valley Steel Co., Niles, O.
 M2 McLouth Steel Corp., Detroit
 M3 Mercer Tube & Mfg. Co., Sharon, Pa.
 M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
 M5 Monarch Steel Div., Hammond, Ind.
 M6 Mystic Iron Works, Everett, Mass.
 N1 National Supply Co., Pittsburgh
 N2 National Tube Div., Pittsburgh
 N3 Niles Rolling Mill Div., Niles, O.
 N4 Northwestern Steel & Wire Co., Sterling, Ill.
 N5 Newport Steel Corp., Newport, Ky.
 N6 Northwest Steel Rolling Mills, Seattle
 N7 Newman Crosby Steel Co., Pawtucket, R. I.
 N8 Northeastern Steel Corp., Bridgeport, Conn.
 O1 Oliver Iron & Steel Co., Pittsburgh
 O2 Oregon Steel Mills, Portland
 P1 Page Steel & Wire Div., Monaca, Pa.
 P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
 P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
 P4 Pittsburgh Coke & Chemical Co., Pittsburgh
 P5 Pittsburgh Screw & Bolt Co., Pittsburgh
 P6 Pittsburgh Steel Co., Pittsburgh
 P7 Portsmouth Div., Detroit Steel Corp., Detroit
 P8 Plymouth Steel Co., Detroit

P9 Pacific States Steel Co., Niles, Cal.
 P10 Precision Drawn Steel Co., Camden, N. J.
 P11 Production Steel Strip Corp., Detroit
 P12 Pacific Steel Rolling Mills, Seattle
 P13 Phoenix Mfg. Co., Joliet, Ill.
 R1 Rover Steel & Mfg. Co., Dover, O.
 R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
 R3 Republic Steel Corp., Cleveland
 R4 Roselli Sons Co., John A., Trenton, N. J.
 R5 Rotary Electric Steel Co., Detroit
 R6 Rodney Metals, Inc., New Bedford, Mass.
 R7 Rome Strip Steel Co., Rome, N. Y.
 S1 Sharon Steel Corp., Sharon, Pa.
 S2 Sheffield Steel Corp., Kansas City
 S3 Shenango Furnace Co., Pittsburgh
 S4 Simonds Saw & Steel Co., Fitchburg, Mass.
 S5 Sweet's Steel Co., Williamsport, Pa.
 S6 Standard Forging Corp., Chicago
 S7 Stanley Works, New Britain, Conn.
 S8 Superior Drawn Steel Co., Monaca, Pa.
 S9 Superior Steel Corp., Carnegie, Pa.
 S10 Semco Steel Service, Buffalo
 T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
 T2 Tennessee Coal & Iron Div., Fairfield
 T3 Tennessee Products & Chem. Corp., Nashville
 T4 Thomas Strip Div., Warren, O.
 T5 Timken Steel & Tube Div., Canton, O.
 T6 Tremont Nail Co., Wareham, Mass.
 T7 Texas Steel Co., Fort Worth
 T8 Thompson Wire Co., Boston
 U1 United States Steel Corp., Pittsburgh
 U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
 U3 Ulrich Stainless Steel, Wallingford, Conn.
 U4 U. S. Pipe & Foundry Co., Birmingham
 W1 Wallingford Steel Co., Wallingford, Conn.
 W2 Washington Steel Corp., Washington, Pa.
 W3 Wirtton Steel Co., Wirtton, W. Va.
 W4 Wheatland Tube Co., Wheatland, Pa.
 W5 Wheeling Steel Corp., Wheeling, W. Va.
 W6 Wickwire Spencer Steel Div., Buffalo
 W7 Wilson Steel & Wire Co., Chicago
 W8 Wisconsin Steel Co., S. Chicago, Ill.
 W9 Woodward Iron Co., Woodward, Ala.
 W10 Wycoff Steel Co., Pittsburgh
 W11 Worcester Pressed Steel Co., Worcester, Mass.
 Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (per cent) i.e.b. mills. Base price about \$200 per net ton.

STANDARD T. & C.	BUTTWELD												SEAMLESS												
	1/2 in.		3/4 in.		1 in.		1 1/4 in.		1 1/2 in.		2 in.		2 1/2 in.		2 in.		2 1/2 in.		3 in.		3 1/2-4 in.				
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	
Sparrows Pt. B3	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75											
Youngstown R3	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75											
Fontana K1	4.50	+10.7	7.50	+6.75	10.00	+3.25	12.50	+2.50	13.00	+1.50	13.50	+1.00	15.00	+1.25											
Pittsburgh J3	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25			
Alton, Ill. L1	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75											
Sharon M3	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75											
Fairless N2	15.50	0.25	18.50	4.25	21.00	7.75	23.50	8.50	24.00	9.50	24.50	10.00	26.00	9.75											
Pittsburgh N1	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25			
Wheeling W5	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75											
Wheeling W4	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25			
Youngstown Y1	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25			
Indiana Harbor Y1	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75											
Lorain N2	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.50	26.00	11.50	26.50	12.00	28.00	11.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25			
E&T STRONG PLAIN ENDS																									
Sparrows Pt. B3	28.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75											
Youngstown R3	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75											
Fairless N2	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75											
Fontana K1	9.00	+4.75	13.00	+6.75	15.00	2.75	15.50	1.50	16.00	2.50	16.50	3.00	17.00	1.75											
Pittsburgh J3	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75			
Alton, Ill. L1	20.0	6.25	24.00	10.25	26.00	13.75	26.50	12.50	27.00	13.50	27.50	14.00	28.00	12.75											
Sharon M3	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75											
Pittsburgh N1	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75			
Wheeling W5	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75											
Wheeling W4	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75											
Youngstown Y1	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75			
Indiana Harbor Y1	21.0	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75											
Lorain N2	22.0	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75			

Threads only, butt-weld and seamless 2 1/2 pt higher discount. Plain ends, butt-weld and seamless, 3-in. and under, 4 1/2 pt higher discount. Butt-weld jobbers discount, 5 pt. Galvanized discounts based on nine price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/2, 1 1/2 and 2-in., 1 pt.; 2 1/2 and 3-in., 1 pt. e.g., zinc price in range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.00¢ per lb.

Steel Prices (Effective July 12, 1955)

To identify producers, see Key on preceding page.

MERCHANT WIRE PRODUCTS

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer <i>U</i>	4.725	5.65	5.825				
So. Chicago <i>R3</i>	4.725	5.65	7.90				
Enosy <i>T2</i>	4.725	5.65		7.90			
Fairfield <i>T2</i>		5.65		7.90	5.625		
Gary <i>U1</i>	4.725	5.65			5.625		
Ind. Harbor <i>T3</i>	4.725	5.625	7.90		5.625		
Johnstown <i>B3</i>		5.65					
Joliet <i>U1</i>		5.65	5.625				
Kansas City <i>S2</i>				7.90			
Lackawanna <i>B3</i>	4.725	5.65	5.825		5.625		
Minneapolis <i>C6</i>	4.725		5.425	7.90	5.625		
Pittsburgh <i>O1</i>							
Pittsburgh <i>P5</i>							
Pittsburgh <i>J3</i>				7.90			
Seattle <i>B2</i>					5.575		
St. Louis <i>B3</i>	4.725	5.425			5.625		
Struthers <i>Y1</i>				7.90			
Terrace <i>C7</i>					5.775		
Williamsport <i>S5</i>		5.65					
Youngstown <i>R3</i>			7.90				

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi- Processed	Fully Processed
Field	8.60	8.60	
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamic	11.85	12.10	12.60
Trans. 72	12.60	13.05	13.55
Trans. 65	13.35		
Trans. 58	13.85	Trans. 50	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Bessemer (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*B3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Cails 75¢ higher

WARE-HOUSES

City	City Delivery Charge	Base price, f.o.b., dollars per 100 lb.													
		Sheets			Strip		Plates		Shapes		Bars		Alloy Bars		
		Hot-Rolled	Cold-Rolled	Galvanized (16 gage)	Hot-Rolled	Cold-Rolled	Hot-Rolled	Standard Structural	Hot-Rolled	Cold Finished	Hot-Rolled As rolled	Hot-Rolled As rolled	Cold-Drawn As rolled	Cold-Drawn As rolled	
Baltimore	3.20	6.62	7.51	7.79	6.69		6.37	6.72	6.68	8.02	12.94	12.54	15.34	15.19	
Birmingham	.15	6.35	7.35	8.25	6.60	8.85	6.65	6.65	6.50	8.85		16.80		19.80	
Boston	.10	6.50	8.10	9.00							12.85	12.60	15.40	15.25	
Buffalo	.25	6.38	7.40	8.84	6.65	7.82	6.80	6.67	6.45	7.40	12.70	12.30	15.10	14.95	
Chicago	.28	6.35	7.38	8.30	6.62			6.52	6.68	6.51	7.25	12.25	12.03	14.60	14.70
Cincinnati	.28	6.49	7.37	8.25	6.88		6.81	6.86	6.75	7.55	12.55	12.30	14.90	14.95	
Cleveland	.28	6.53	7.42	8.30	6.91		6.86	6.86	6.80	7.35	11.96	12.11		14.76	
Denver	.15	6.15	9.45	10.72	8.40		8.10	8.15	8.30	9.92				16.77	
Detroit	.28	6.57	7.57	8.58	6.90	7.25	6.80	7.10	6.79	7.54	12.65	12.25	15.05	14.90	
Houston	.28	7.35	7.80	9.93	7.70		7.35	7.60	7.70	9.30		13.25			
Kansas City	.28	7.05	8.05	8.87	7.29		7.19	7.36	7.18	8.82	13.12	12.72	15.52	16.72	
Los Angeles	.10	8.05	10.00	11.00	7.85		8.62	8.30	8.15	11.25*		14.25		17.85	
Memphis	.10	6.79	7.69	8.42	6.90		7.01	7.09	6.88	8.65					
Milwaukee	.28	6.47	7.47	8.21	6.71		6.61	6.88	6.60	7.44	12.34	12.14	14.69	14.79	
New Orleans	.15	6.70	7.65	9.23	6.80		6.90	7.05	6.80	8.70					
New York	.10	7.56	7.91	8.79	8.17	10.68	7.86	8.09	7.37	8.73	13.73	13.28	15.23	15.08	
Norfolk	.28	7.00					7.10	7.10	7.10	8.60					
Philadelphia	.10	6.19	7.44	8.26	6.96		6.49	6.54	6.74	7.66	12.61	12.26	15.06	14.99	
Pittsburgh	.28	6.38	7.38	8.30	6.72		6.52	6.69	6.51	7.35	12.45	12.05	14.85	14.70	
Portland	.28	7.00	7.75	9.10	7.05		6.85	7.00	7.05	10.20					
Salt Lake City	.28	7.65	10.20	10.70	9.05		7.70	7.70	8.80	10.95					
San Francisco	.10	7.58	8.80	9.40	7.75		7.35	7.45	7.30	10.80		13.30		18.45	
Seattle	.28	7.55	8.95	9.45	7.80		7.40	7.50	7.35	10.95		13.35		16.50	
St. Louis	.28	6.10	9.80	10.15	6.20		7.80	7.75	7.80	10.95		13.80		16.45	
St. Paul	.28	6.67	7.67	8.50	6.91	8.13	6.81	7.09	6.80	7.64	12.74	10.44	14.94	12.79	
							7.18	7.35	7.17	8.81		12.71		15.36	

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) \$2.25 delivery. (4) 1000 to 1999 lb, \$2.25 delivery.

* Plus analysis charge.

F.o.b. Mill	Standard & Coated Nails		Woven Wire Fence 9-15½ ga.		C-10" Fence Posts		Single Loop Wire Ties		Galv. Barbed and Twisted Barbless Wire		Merchant Wire Amt'd		Merchant Wire Galv.	
	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal
Alabama City <i>R3</i>	152	162	173	175	7.40	7.80								
Aliquippa, Pa. <i>J3</i>	152	162												
Atlanta <i>A8</i>														
Bartonsville <i>K2</i>														
Buffalo <i>W6</i>														
Chicago, Ill. <i>N4</i>	152	162	173	179	7.40	7.95								
Cleveland <i>A5</i>	154	164	175	175	7.40	7.85								
Crawfordsville <i>M4</i>														
Deerfield, Ill. <i>A7</i>	152	162	173	175	7.40	7.80								
Galveston <i>D4</i>														
Houston <i>S2</i>														
Johnstown, Pa. <i>B3</i>	152	162	175	175	7.40	7.80								
Joliet, Ill. <i>A5</i>	152	162	173	175	7.40	7.80								
Kokomo, Ind. <i>C9</i>	154	164	175	177	7.50	7.90								
Los Angeles <i>B2</i>														
Kansas City <i>S2</i>														
Minneapolis <i>C6</i>	152	162												
Milwaukee, Ill. <i>R6</i>														
Pittsburgh, Cal. <i>C7</i>	171	185												
Portsmouth <i>P3</i>														
Rankin, Pa. <i>A5</i>	152	162	175	175	7.40	7.80								
St. Louis, Mo. <i>R3</i>	152	162	175	175	7.40	7.80								
S. San Francisco <i>C6</i>														
Sparrows Pt. <i>B3</i>														
Struthers, O. <i>V1</i>														
Worcester, Mass. <i>A5</i>	158													
Williamsport, Pa. <i>S5</i>														

Galvanized products computed with zinc at 5¢ per lb. Exceptions: Chicago, zinc 12.5¢.

C-R SPRING STEEL

F.o.b. Mill	CARBON CONTENT					
	0.26	0.41	0.61	0.81	1.06	1.35
Buffalo, N. Y. <i>R7</i>	7.00	8.95	10.50			
Carnegie, Pa. <i>S9</i>		8.95	10.50	12.65	15.35	
Cleveland <i>A5</i>	7.00	8.95	10.50	12.65	15.35	
Detroit <i>D1</i>						
Detroit <i>D2</i>						
Harrison, N. J. <i>C11</i>						
Indianapolis <i>C5</i>						
New Castle, Pa. <i>B7</i>	7.00	8.95	10.50	12.65	15.35	
New Haven, Conn. <i>D1</i>						
Pawtucket, R. I. <i>N7</i>						
Pittsburgh <i>S7</i>	7.00	8.95	10.50	12.65	15.35	
Rivertown, Ill. <i>A1</i>	7.10	8.95	10.50	12.65	15.35	
Sharon, Pa. <i>S1</i>	7.00	8.95	10.50	12.65	15.35	
Trenton <i>R6</i>						
Wallingford <i>W1</i>						
Warren, Ohio <i>T4</i>						
Winton, W. Va. <i>W3</i>	7.10	8.95	10.50			
Youngstown <i>C5</i>	7.10	8.95	10.50	12.65	15.35	

BOILER TUBES

F.o.b. Mill	Size		Seamless		Elec. Weld	
OD In.	B.W. G.	H.R.	C			

Miscellaneous Prices

(Effective July 18, 1958) (Unrevised)

TOOL STEEL

	W.	Cr	V	Mn	Co	per lb
18	4	1	—	—	5	\$1.54
18	4	—	—	—	—	\$2.245
18	4	2	—	—	—	1.705
1.5	4	1.5	8	—	—	.90
6	4	2	6	—	—	1.29
High-carbon chromium						.75
Oil hardened manganese						.405
Special carbon						.37
Extra carbon						.31
Regular carbon						.26
Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.						

CLAD STEEL

Base prices, cents per lb, f.o.b.

Cladding	Plate (A3, J2, L9)			Sheet (J7)
	10 pt	15 pt	20 pt	25 pt
304	28.30	30.95	33.00	29.75
316	33.40	36.10	38.00	42.75
321	30.00	32.65	35.20	34.25
347	32.20	35.40	38.00	44.25
403	23.90	27.50	31.10	—
410, 430	23.40	27.00	30.40	—

CR Strip (39) Copper 10 pt 2 sides 33.00 1 side 26.00

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1958 season.

	Gross Ton
Openhearth lump	\$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$13.00 to \$18.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$16.00 to \$16.50
Foundry, oven coke	
Buffalo, del'd	\$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	26.50
New England, del'd	26.85
Seaboard, N. J., f.o.b.	24.55
Philadelphia, f.o.b.	24.00
Sweden, Pa., f.o.b.	24.00
Plaineville, Ohio, f.o.b.	25.50
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	22.00	48	110	10.00
20	72	21.25	100	110	9.50
16 to 18	72	21.00	38	110	9.00
14	72	22.00	38	110	9.00
12	72	22.25	34	72 to 94	9.00
8 to 10	66	22.75	38	90	9.00
7	66	22.00	17	72	9.00
6	66	25.50	14	72	10.25
4	48	28.50	16, 12	90	11.10
3	48	36.00	8	90	11.40
2 1/2	36	36.70			
2	24	47.75			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

		Discount	
	Less	Case	C.
1/4 in. & smaller x 4 in. & shorter	2	22	
1/4 in. & smaller x 6 in. & shorter	3	18	
9/16 in. & 5/8 in. x 6 in. & shorter	4	17	
5/8 in. & larger x 6 in. & shorter	6	15	
All diam. longer than 6 in.	+15		
5/8 in. & smaller x 6 in. & shorter	+2	18	
Lag, all diam. x 6 in. & shorter	6	25	
Lag, all diam. longer than 6 in.	+2	19	
Plow bolts	23	23	

Nuts, H.P., C.P., reg. & hvy.

	Discount			
	Base	Case	Discount	or Keg
5/8" or smaller	55	64		
5/8" to 1 1/4" inclusive	55	66		
1 1/4" to 1 1/2" inclusive	60	67 1/2		

C.P. Hex. regular & hvy.

	Discount	
	Base	Case
All sizes	55	64

Hot Galv Nuts (all types)

	Discount	
	Base	Case
5/8" or smaller	38	50
5/8" to 1 1/4" inclusive	41	52 1/2

Finished, Semi-finished, Slotted or Cassetted Nuts

	Discount	
	Base	Case
All sizes	55	66

Rivets

	Base per 100 lb	
	Per Off List	
1/4 in. & larger	38.25	
7/16 in. and smaller	37	

Cap Screws

	Discount	H.C. Heat
	Bright	Treated
New std. hex head, packed		
5/8" x 6" and smaller and shorter	38	38
5/8", 3/4", 1" x 6" and shorter	15	1
New std. hex head, bulk		
5/8" x 6" and smaller and shorter	50	42
5/8", 3/4", 1" x 6" and shorter	32	21

*Minimum quantity per item:

15,000 pieces 5/8", 5/16", 3/8", 1/2", 5/8" diam.

5,000 pieces 7/16", 1/2", 9/16", 5/8", 1/2" diam.

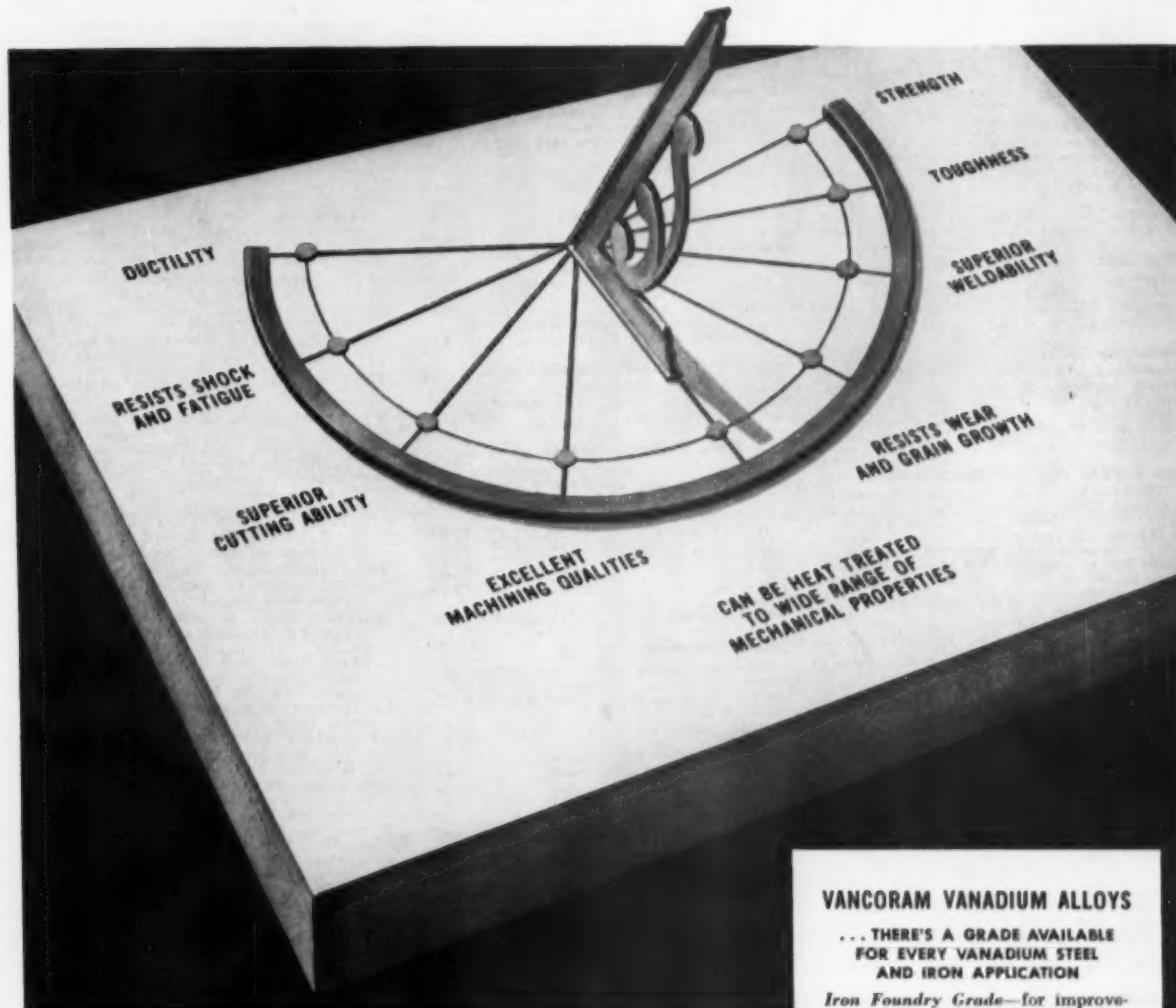
2,000 pieces 1/4", 5/16", 1" diam.

15,000 pieces 5/8", 1/2", 9/16", 1" diam.

15,000 pieces 5/8", 1/2", 9/1

VERSATILE VANADIUM STEELS

for almost any property under the sun...



If you have a problem of meeting tough specifications, vanadium may help you do the job.

Either alone or in combination with other alloying elements, vanadium—in the form of Vancoram ferrovanadium—is one of the most versatile and dependable of alloying elements added to steel. It enhances the effect of other alloys and serves to improve the physical properties of the metal.

Just call our nearest sales office and we'll be happy to send a Technical Service representative to discuss your problem and offer recommendations.

VANCORAM VANADIUM ALLOYS

... THERE'S A GRADE AVAILABLE FOR EVERY VANADIUM STEEL AND IRON APPLICATION

Iron Foundry Grade—for improvement of physical properties of iron.

Grade A (Open Hearth)—for low vanadium steels and vanadium cast irons.

Grade B (Crucible)—for tool steels and other high-vanadium steels requiring a limited silicon addition.

Grade C (Primos)—for making the highest vanadium and the lowest silicon addition to tool steels.

Vanadium Metal (90% grade)—for special iron-free (nonferrous) or low-iron alloys, or for low impurity ferrous alloys.

Vanadium Pentoxide, Tech.—a source of vanadium in basic electric-furnace steels. A base for numerous chemical compounds.

VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y.
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Producers of alloys, metals and chemicals

Ferroalloy Prices

(Effective July 12, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.	
0.025% C .. 36.00	0.15% C .. 38.75
0.025% C ..	0.20% C .. 33.50
Simplex .. 34.50	0.50% C .. 33.25
0.05% C .. 34.50	1.00% C .. 33.00
0.10% C .. 34.00	2.00% C .. 32.75
65-69% Cr, 4-9% C ..	34.75
62-66% Cr, 4-6% C, 6.0% Si ..	26.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.	
High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carloads ..	25.85
Ton lots ..	28.00
Less ton lots ..	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add \$4 per lb to regular low carbon ferrochrome price schedule. Add \$4 for each additional 0.25% of N.	
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Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.	
0.10% max. C ..	\$1.18
0.50% max. C ..	1.16
9 to 11% C ..	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.00¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.	
Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.00¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.	
Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.00¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.	
Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.00¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.	
Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.00¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.	

Calcium-Silicon

Contract price per lb of alloy, lump delivered.	
50-53% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads ..	19.00
Ton lots ..	22.10
Less ton lots ..	23.60

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered.	
16-20% Cr, 14-18% Mn, 58-59% Si.	
Carloads ..	30.00
Ton lots ..	22.30
Less ton lots ..	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 66-68% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/2 in. x 12 mesh.	
Ton lots ..	17.50
Less ton lots ..	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.	
Carload lots ..	16.60
Ton lots ..	18.10
Less ton lots ..	19.35

Graphidex No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed ..	17.50
Ton lots to carload packed ..	18.50
Less ton lots ..	20.00

Ferromanganese

Maximum contract base price, f.o.b. lump size, base content 74 to 76 pct Mn.	
Producing Point per-lb	

Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.

Clairton, Pa. 9.50

Sheridan, Pa. 9.50

Philip, Ohio 9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk .. 11.85

Ton lots packed .. 13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.	
Manganese Silicon	
16 to 19% 3% max.	\$84.00
19 to 21% 3% max.	86.00
21 to 23% 3% max.	88.50
23 to 26% 3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carloads, packed ..	45.00
Ton lots ..	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
0.10% max. C ..	\$1.18
0.50% max. C ..	1.16
9 to 11% C ..	1.25

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn	
Carloads ..	31.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.	
Carloads Ton Less	
0.07% max. C, 0.06%	
P, 90% Mn ..	32.00
0.07% max. C ..	32.85
0.15% max. C ..	32.80
0.20% max. C ..	32.80
0.50% max. C ..	32.80
0.75% max. C, 80-85%	25.30
Mn, 5.0-7.0% Si ..	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mo, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.	
Carload bulk ..	11.00
Ton lots ..	12.65
Briquet contract basis carloads, bulk, delivered, per lb of briquet ..	12.45
Ton lots, packed ..	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$85.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$88.00. Add \$1.00 per ton for each additional 0.50% Si up to and including 17%. Add \$1.45 for each 0.50% Mn over 1%.	
Ton lots ..	16.75¢
Less ton lots ..	17.25¢

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.	
Carloads, bulk ..	6.55
Ton lots ..	8.35

Electric Ferresilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.	
25% Si ..	20.00
50% Si ..	12.00
65% Si ..	13.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.	
Cast Turnings Distilled	
Ton lots ..	\$2.05
Less ton lots ..	2.40

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.	
Openhearth ..	\$3.00-\$3.10
Crucible ..	3.10-3.20
High speed steel (Primus) ..	3.20-3.30

Alifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.	
Carloads ..	9.25¢
Ton lots ..	10.15

Calcium molybdate, 46.3-46.6%

f.o.b. Langloch, Pa., per pound contained Mo	
Ton lots ..	\$1.25

Ferrocolumbium, 50-60%, 2 in. x

x D contract basis, delivered per pound contained Crb.	
Ton lots ..	\$6.90
Less ton lots ..	6.95

Ferro-tantalum-columbium, 20%

Ta, 40% Crb, 30% C, contract basis, del'd, ton lots, 2-in. x	
D per lb cont'd Crb plus Ta ..	\$4.65

Ferrophosphorus, electric, 22-26%

car, 40% car lots, f.o.b. Siglo, Mt. Pleasant, Tenn. \$4.00 unitage, per gross ton ..	
10 tons to less carload ..	\$110.00
10 tons to less carload ..	\$110.00

Ferrotitanium, 40% regular grade

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ..	
Ton lots ..	\$1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ..

per lb ..	
</

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Stopping motors quickly is a key factor in cutting waste time — stepping up production. Here are a few important reasons why America's leading motor makers and design engineers specify Stearns magnetic disc brakes to do this profit-building job.

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Low inertia — Fast, smooth engagement and disengagement.

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Widely adaptable — DC or AC with rectifier. Automatic and remote control. Operates in conjunction with electronic circuits.

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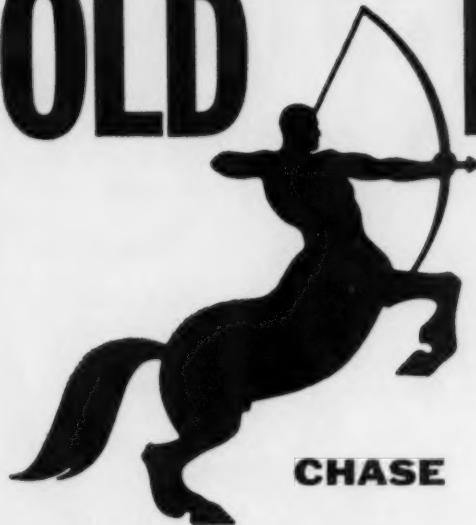


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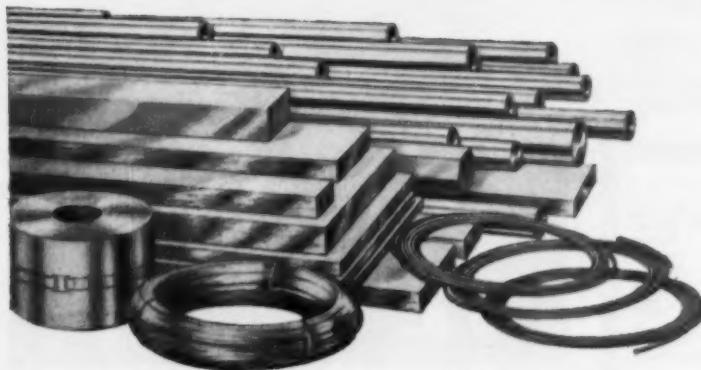
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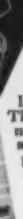
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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Coast Outlook Good . . . West Coast used machinery business is having some ups and downs—but nothing serious enough to change a generally optimistic outlook.

In the Seattle-Tacoma area, several dealers checked by THE IRON AGE say sales have fallen off from a month ago. They feel things should pick up soon. Metalworking shops are getting busier.

Demand is now up for small lathes and mills. And there's always a steady market for top-quality metalworking machinery.

Supplies of good-quality machinery are a bit tight. Prices are holding firm.

Frisco Spurts . . . In San Francisco, there was a sudden unexpected spurt for several weeks. Business is running about 25 pct ahead of last year. Metalworking firms are looking for a good third quarter.

Better-grade merchandise still sells best. Standard tools are in fair demand, prices are stable, and supplies adequate. Best sellers now are boring mills and good milling machines.

Talk of U. S. Air Force dispersal plans for southern California's aircraft industry is affecting business. (See THE IRON AGE, May 5, 1955, page 85.) Dealers in the area say turret lathes, small mills, and planers, usually good sellers in the industry, are noticeably down. One company expects business to get real rough in about 6 months.

Expansion Continues . . . However, metalworking expansion in southern California continues. And at a good pace, too. This is holding the market steady.

The big number of plant expansions is putting a lot of machinery on the market. Dealers get all they need. They're not worried about having to ship stuff in from the East to fill in their stocks.

Heavy machinery business is good. Sheet metal equipment sales are booming along. Hottest items

now are brakes, shears, and big punch presses. There's not much demand for small punch presses or large welders.

Small welding equipment is selling nicely. Most of it goes along with sheet metal equipment for electronics, guided missiles work, and home-building industries.

Discuss Shipping . . . Problems in shipping used machinery were covered in a recent report by Harold Goldstein, chairman of the Freight Reclassification Committee of the Machinery Dealers National Assn.

Appearing before the National Freight Claim Council, Mr. Goldstein pointed out that most difficulties arise from shipments originating with corporations selling equipment. He pointed out a number of steps truckers could take to improve this situation, which is beyond the control of dealers.

Plates Cause Shifting . . . Truckers, he said, should not use steel floor plates because machines, even when skidded, will shift too easily. Drivers should be educated to the requirements of safe loading, with full attention to the problems of balance involved in machinery shipment.

Mr. Goldstein said a closer enforcement of existing loading regulations would reduce damage. He acknowledged the difficulties in securing universal cooperation with such an effort but expressed the belief that a concerted drive by top management could improve the situation. An inspection system for questionable loads would also help matters, he said.

Commenting generally on the session, Mr. Goldstein said discussions were marked by a constructive interest in the problem of used machinery shipments. He said plans have been made for a Council representative to work with MDNA in preparing educational material and noted an improved attitude toward problems.

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45,500 lbs. Max. Starting Pull
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With 2 Trolleys 63/4 ton & 10 ton Aux.

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25 ton Henry & Wright, 1 1/2" Stroke, Double Roll
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9—One Electro Cleaner Tank 3' x 5'
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12—One Nickel Plating Tank 3' x 3' x 5' deep
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and Cad.
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16—One 300 AMP Rectifier
17—One Motor Generator Set
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19—One Emergency Shower
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21—Various Rigging Equipment for above
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40" No. 1642 Blanchard 2-spd., rotary, new 1948.
72" Colonial broach grinder, Lathe
72" Henschel 3-spd. rotary surface, new 1948.
18" x 36" Landis gap type cylindrical, new 1941.

LATHES

No. 3 Jones & Lamson ram type univ. turret (2).
14" x 6" Hendey Turret, 1940.

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36" & 48" Rockford Hyd. Openmide Shaper-Planers.

48" x 48" x 10" Gray Maxi-Service.

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200 ton No. 7C Bliss 6.0. D.C.

260 ton No. 705/2-72 Toledo D.C. Toggle drawing.

350 ton No. 489C Bliss D.C. Toggle drawing.

150 ton No. 1-C Cleveland D.C. Lathe type.

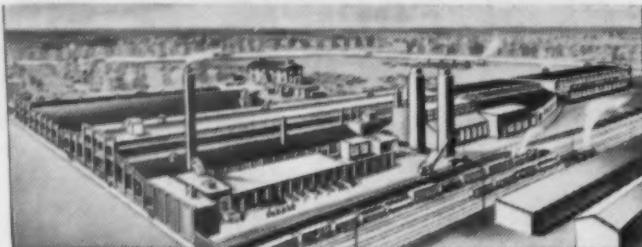
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D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2000	Whe.	Tandem	550	800
1	2200	G.E.	MCF	600	400/500
2	1500	Whe.	Rev.	600	800
1	1400	G.E.	MCF	600	65/100
1	1200	G.E.	MCF	600	750/950
1	1000	G.E.	MCF	600	850/950
2	840	Whe.	QM	250	140/170
1	800	Whe.	QM	250	140/170
1	600	Al. Ch.	QM	250	140/170
1	500	Whe.	CO-318	600	800/900
1	500	G.E.	MCF	250	800/900
2	450	Whe.	QM	550	415
1	300	Whe.	MPC	350	840/900
1	200	G.E.	Rev.	1070	250
2	200	G.E.	CH-1450E	250	840/1500
2	200	Whe.	CH-511B	250	800/850
1	150	G.E.	CH-511B	600	850/1500
1	150	Cr. Wh.	SMH	350	1150
1	150	Cr. Wh.	SMH-TKFC	350	880
1	150	Whe.	SMH-511B	350	900/1000
1	150	Whe.	SMH-251	350	850/950
1	120	G.E.	MCF	350	1250/1600
1	125	Whe.	HK-161	550	840/1500
1	125	Whe.	HK-163	250	850
1	125	G.E.	MDS-418	250	415

M-C Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	R.P.M.	D.C.	A.C.
				Volts	Volts
1	2000	3100	G.E.	450	230/250
1	1750	3100	G.E.	514	250/250
1	2000	G.E.	250	600	11000
1	2000	G.E.	514	600	6500/13200
1	2000	G.E.	450	600	2300/4600
1	1500	G.E.	720	600	6000/13200
1	1500	C.W.	B14	80/115	4000/13000
1	1500	G.E.	720	60	2200/4000
1	750	G.E.	720	275	3200/6500
1	750	C.W.	B14	80/115	2300
1	600	G.E.	720	360	440/800

TRANSFORMERS

Qu. KVA	Make	Type	Ph.	Voltages
2	4000	G.E.	POW	3 13500x115/2000
1	3000	Wagner	HPW-50	3 25400x13400
2	3000	G.E.	HVD112	1 85000x13200
2	1000	G.E.	HVD112	3 24000x180
6	1000	Wagner	O18C	1 82300x180
8	857	G.E.	HD	1 18800x2300

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Compressor—2 stage, 38.5 MSCF/hr @ 2300 psig discharge pressure

Clarkcooler—forced draft, Model 141

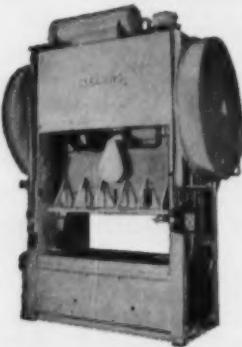
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#47 Heald Single End Borematic Serial #4646

DB 212-A Excello Single End Borematic Serial #10160

42" Bullard Vertical Turret Lathe Serial #14001

36" New Era Bullard Serial #7136

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1	1500	G.E.	514	250	15,000/6600
1	1200	Whse.	720	600	2200
1	1000	G.E.	500	250	2200
1	1000	Whse.	514	600	11,000/6600
1	500	C.W.	720	575/600	2300/440
1	500	C.W.	720	125/250	2300
1	500	G.E.	514	125	2300
1	400	Whse.	1200	125/250	2300/440
1	300	G.E.	900	125/250	2300
1	200	Whse.	1200	600	2300/440
1	150	G.E.	720	125	2300/440
1	100	Whse.	900	250	2300
1	100	C.W.	1200	125	2300
1	500	Whse.	1200	250	440/220
					4100

DIRECT CURRENT MOTORS

Gu.	H.P.	Make	Type	Volts	R.P.M.
2*	3000	Whse.	Enc.	525	600
1	3000	Whse.	Mill	600	220/400
1	1500	Whse.	Enc.	525	600
1	1200	G.E.	MCF-6	600	220/700
4	200	Whse.	Enc.	525	600
1	700	Whse.	Mill	800	230/750
1	700	Whse.	Mill	800	230/750
2	500	Whse.	MJII	525	225/710
1	500	G.E.	CD-10-8	220	1150
1	500	G.E.	MPC	220	250/975
1	500	G.E.	MCF	600	300/665
1	200/250	G.E.	MD	525	230
1	200	G.E.	MD	525	230
1	200	G.E.	MD	525	230
1	200	G.E.	MDP-430	220	350/410
1	180	G.E.	MPC	220	400
1	150	Whse.	HK-301	220	300/900
1	125	Whse.	HK-184	220	675/850
1	125	Whse.	HK-180	600	600
1	125	G.E.	MPC-8	220	400/600
1	125	G.E.	MPC	220	400/1125
1	100/100	G.E.	MD	525	450/1350
8	75	G.E.	M-8	220	450/1350
1	75	Cost.	DI47X	220	425/1275
8	50	Whse.	HK-131.5	220	600/2300
1	40	Whse.	HK-149	220	500/1700
1	35	Whse.	HK-132	220	500/1600
1	35	Whse.	HK-150	220	250/1600
1	35%	Whse.	HK-150	220	400/1800
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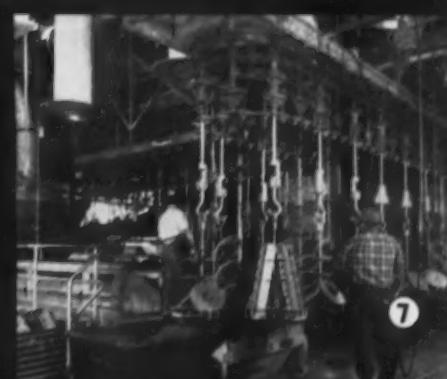
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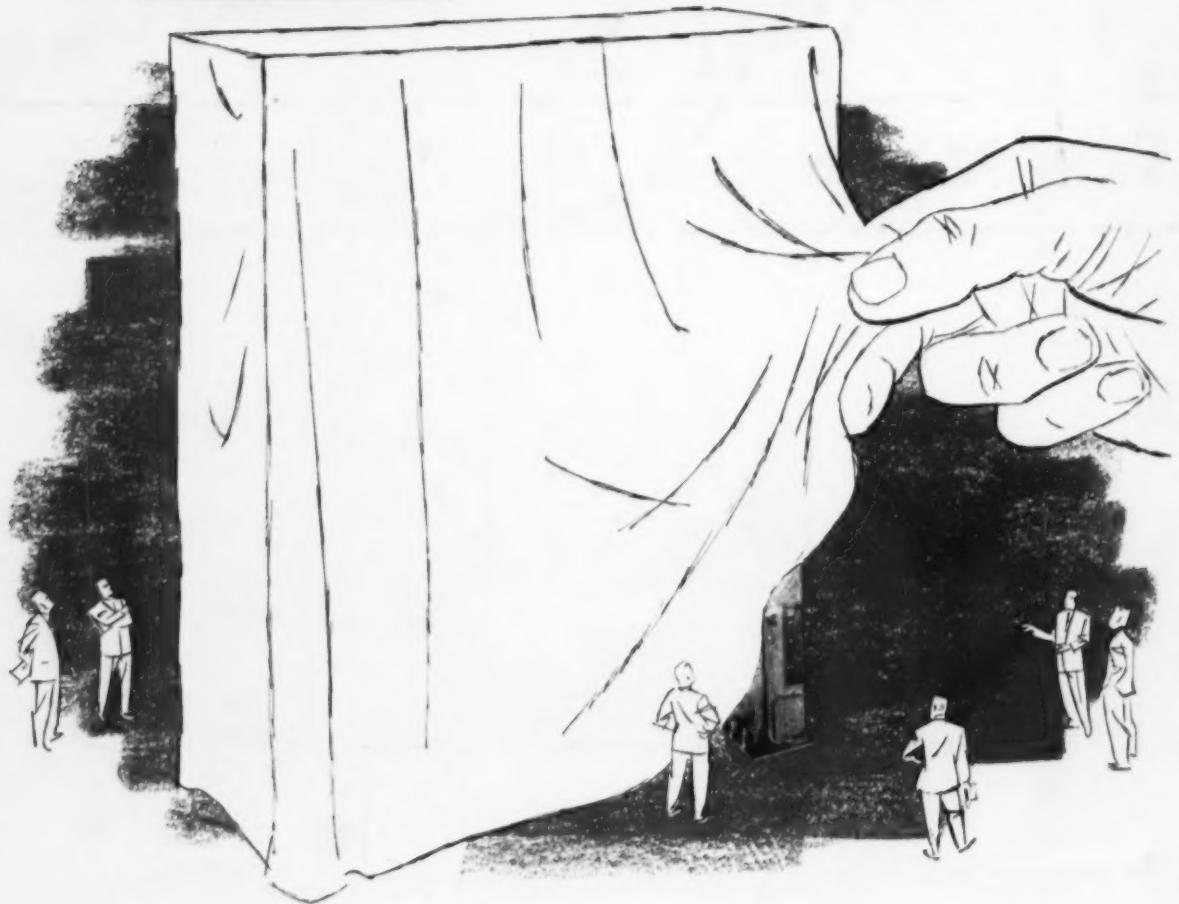
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